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# THE AMERICAN HOSPITAL OF THE TWENTIETH CENTURY

By
EDWARD F. STEVENS, Architect

THIRD EDITION

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# THE AMERICAN HOSPITAL OF THE TWENTIETH CENTURY

A treatise on the development of medical institutions, both in Europe and in America, since the beginning of the present century.

By

EDWARD F. STEVENS, Architect

Fellow of American Institute of Architects
Member of Royal Architectural Institute of Canada
Member of American Hospital Association

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To

WARREN LEVERNE BABCOCK, M. D.

Superintendent of the Grace Hospital
DETROIT, MICHIGAN

AND

JAMES CAMERON CONNELL, M. A., M. D.

Dean, Medical Faculty, Queen's University
KINGSTON, ONTARIO

Whose encouragement and advice decided the writer of this book to devote his entire practice both in the United States and Canada to institutions for the sick,

This book is respectfully dedicated.

72758

# FOREWORD

THE great problem in hospital architecture is not merely housing the sick, but housing them in such a way that every scientific method may be used for their betterment and recovery. The theory of hospital construction is a living thing, changing from year to year as medicine and surgery change. The designing of a hospital building should be considered a sacred trust, since the life or death of a patient may depend upon the facilities for caring for him. A recent writer has well said, "The Hospital has forever passed out of the class of grim, ugly structures representing the necessities of communities into a class of important buildings requiring definite architectural expression and design."

The examples of hospital architecture herewith presented are taken mainly from American institutions, but a few plans of foreign hospitals are introduced for comparison and study.

While many exterior designs are here shown, no attempt has been made to discuss architectural style, forms of construction or building material, since these may not differ from those of other classes of buildings. While the presence of beauty, either in architectural forms of decoration or sculpture, has its psychological effect upon the patient, the arrangement of the plan is really of prime importance in meeting the hospital problem.

It is hoped that this book may be helpful to some few fellow architects and to hospital administrators. If it is found to be, the author will feel well repaid for the time spent in making this material available.

## FOREWORD TO THIRD EDITION

The last five years have shown a more marked development in hospital planning than any previous twenty years. Interest in the subject has correspondingly increased.

From the fact that first and second editions of this book have been exhausted, the author is led to infer an appreciation of the work by those interested in hospital planning. The publishers have urged revision and some additions to the previous text. These considerations have led to the preparation of another edition. It is to be regretted that so few of the large number of well thought-out plans of various architects can be included.

The author is indebted to many friends for material, to the publishers of architectural, medical and hospital journals for illustrations, and to Miss Minnie Goodnow for work in editing. Without their assistance it would not have been possible to have produced this book while attending to an ever increasing practice.

45 Newbury Street, Boston. EDWARD F. STEVENS.

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# THE AMERICAN HOSPITAL OF THE TWENTIETH CENTURY

## CHAPTER I

### IN GENERAL

HISTORICAL. It would be vastly interesting to trace the evolution of hospital building and equipment from the crude structures of ancient times designed to house the sick to the comprehensive hospital of today, and to show how architecture and equipment have advanced stride for stride with medical and surgical progress; but in these days of vivid and insistent research and accomplishment there is no time for comparative speculation or historical review. All our energies are needed to keep pace with the newly devised methods which are constantly being put in practice and to facilitate these achievements by proper housing and equipment. Hospital building, since the beginning of the twentieth century, has increased enormously.

In the year 1911 the number of hospitals in the United States was said to be 2,500.

In 1924 the number was 7370, with 814,000 beds. This gives about two beds to each one thousand of population.

Even with this vast number only about* "twelve per cent. of the sick people in this country who are ill enough to need a doctor are cared for in hospitals."

The line of advance has been influenced not only by the medical men and the nursing force, but by the social welfare worker, the hospital commission, the society to suppress tuberculosis, and the public at large; for the people are realizing that the hospital is built to benefit humanity and not to afford a place in which to die. "All hope abandon ye who enter here" no longer is the appropriate inscription for the hospital gate. But this advance has been by gradual steps—an improved ward unit here; better methods of service there; building up thus by experimental work and research a standard to meet the needs as they appear, and with the ever-increasing feeling that the welfare of the patient is of more importance than the zeal for science.

*Hospital Sites.* Before taking up the subject of the planning of the hospital itself, we must consider the very important subject of the site. Attractive locations for public buildings or even for residences are rarely suitable for hospitals.

The improvement of the patient, which is the fundamental pur-

*Editorial Modern Hospital, Vol. VIII No. 1.

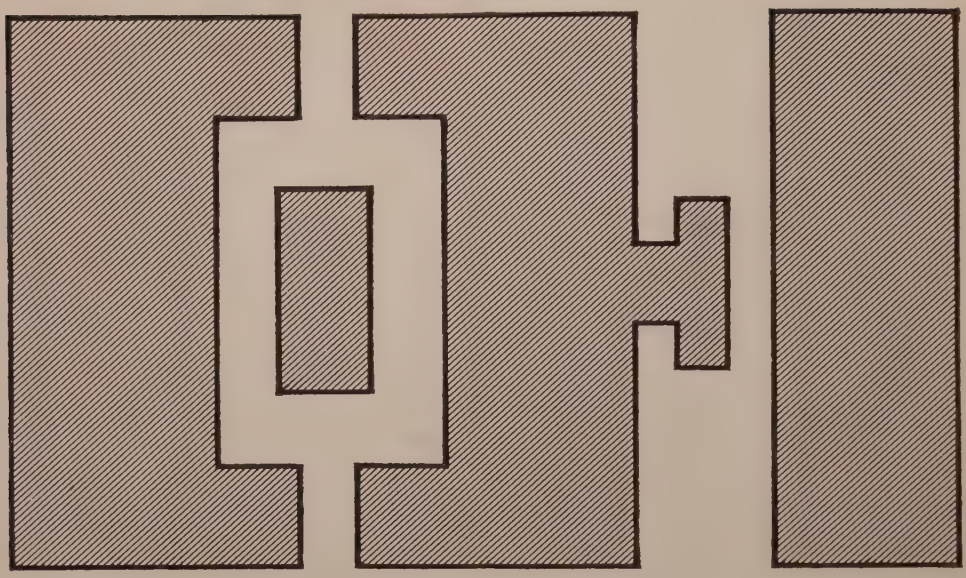


FIG. 1. DIAGRAM OF AN OLD ENGLISH HOSPITAL

pose of the institution, depends in large measure on its situation and environment—the contour of the land, the surrounding country, the aspect, the accessibility for friends of the patient and for visiting physicians, remoteness from disturbing influences, a site of sufficient size to insure privacy, are all contributory elements for the process of recovery.

A southern exposure is always desirable, with the land sloping toward the south. If in the country, it is still more advantageous if the north is protected by evergreen trees.

Enough land should be provided to allow for growth. In building even the first portion, the future should be considered and the plans for the development of the entire institution studied and worked out so that the structures may be grouped to the best advantage. Whatever portion is built, it should be done with reference to the completed whole. Oftentimes the central or administration building is all that can be managed in the beginning, and in this must be disposed temporarily all the departments.

If the site is in the city, the same care in selection should be exercised. Smoke from adjoining chimneys, noise from nearby railroads, and proximity to a noisy thoroughfare or factory are menaces to be considered.

The suggestions for treating the grounds of an institution will be taken up in the chapter on Landscape Architecture.

*Orientation.* The orientation of a hospital, i. e., its setting with

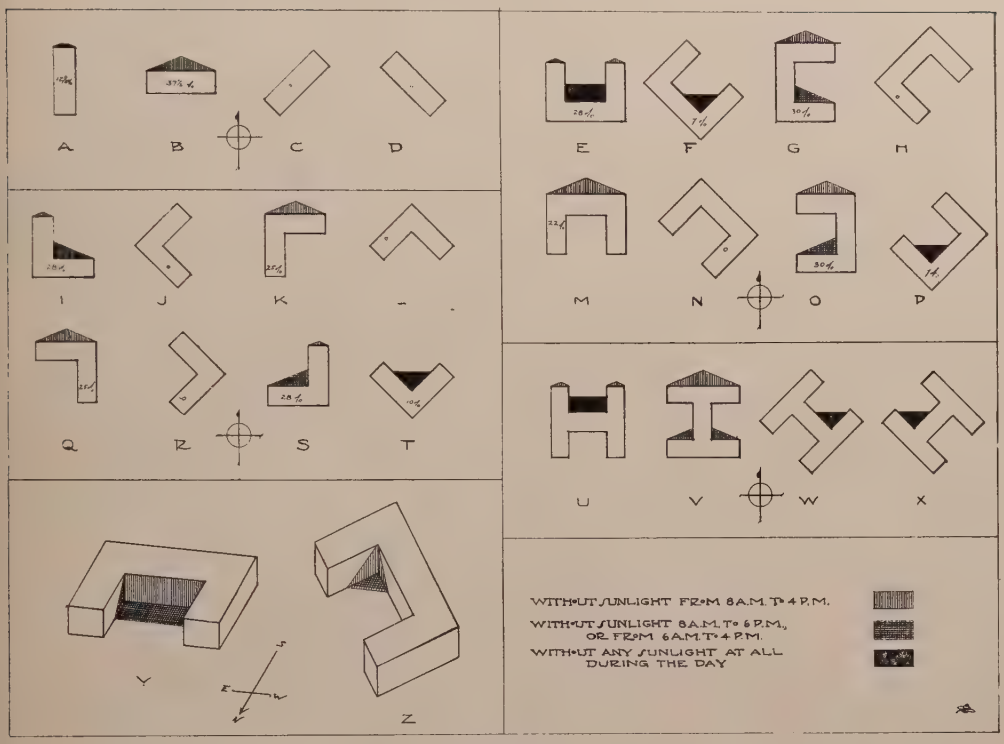



FIG. 2. ORIENTATION DIAGRAM
(Atkinson)

reference to light and sunshine, should be very carefully studied. The building should be placed with due regard not only to sunlight, which is as important a factor in a hospital as any one thing, but also with reference to the prevailing winds.

The early hospitals were congested groups of buildings, with little or no provision for light and air. (See Fig. 1.) The grounds surrounding the hospital building should be flooded with sunlight, as well as the rooms occupied by patients, since cold and soggy ground will react unfavorably on buildings near it. Neither is a pavilion surrounding a courtyard good hospital planning, nor a U-shaped building, if the open side of the U is toward the north. By reference to the diagram (Fig. 2) taken from Atkinson, it will be seen that a rectangular building placed with its main axis running north and south will have a very small portion in shadow during the hours of daylight, while if the same building be placed with an east and west axis the entire north side will be in shadow. L and H forms of buildings, placed at varying angles to the north, will receive more or less sunlight according to the angles they face.

In planning the interior of the building, the portion which receives no sun at all during the day should be used, so far as possible, for utilities, staircases, and rooms not requiring sunlight, leaving for patients' rooms the sides which receive sunlight some portion of the day.

*Buildings.* The building or buildings should be simple in style and designed to make a pleasing impression upon the patients, with the entrance speaking a welcome. The motto suggested for the Virchow, in Berlin, might well be placed over the entrance of many another hospital—"While treating the disease, do not forget to treat the man."

The adoption of any certain type of hospital building must depend upon (a) environment, (b) climate, and (c) available funds.

In this day of high cost of construction, scarcity of servant labor, and perfection of mechanical schemes, the concentrated or "block" plan is considered to be more favorable and economical of construction and to afford greater facilities in service. There are certain localities

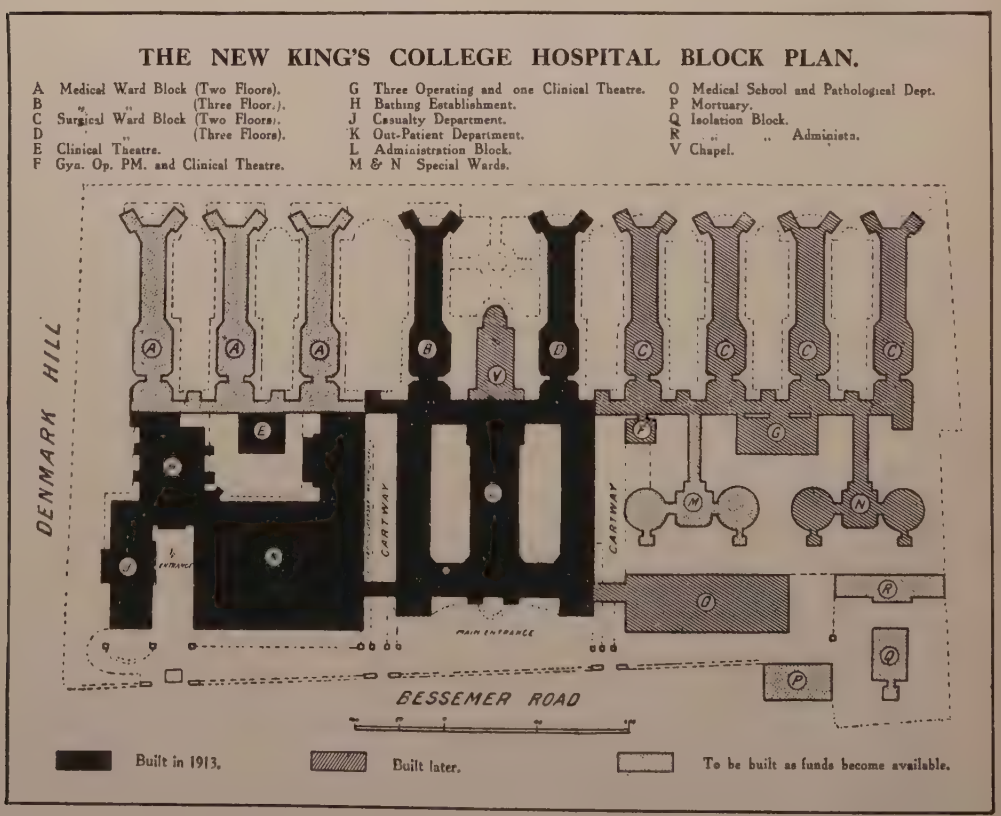



FIG. 3. PLOT PLAN, KING'S COLLEGE HOSPITAL, LONDON, ENGLAND

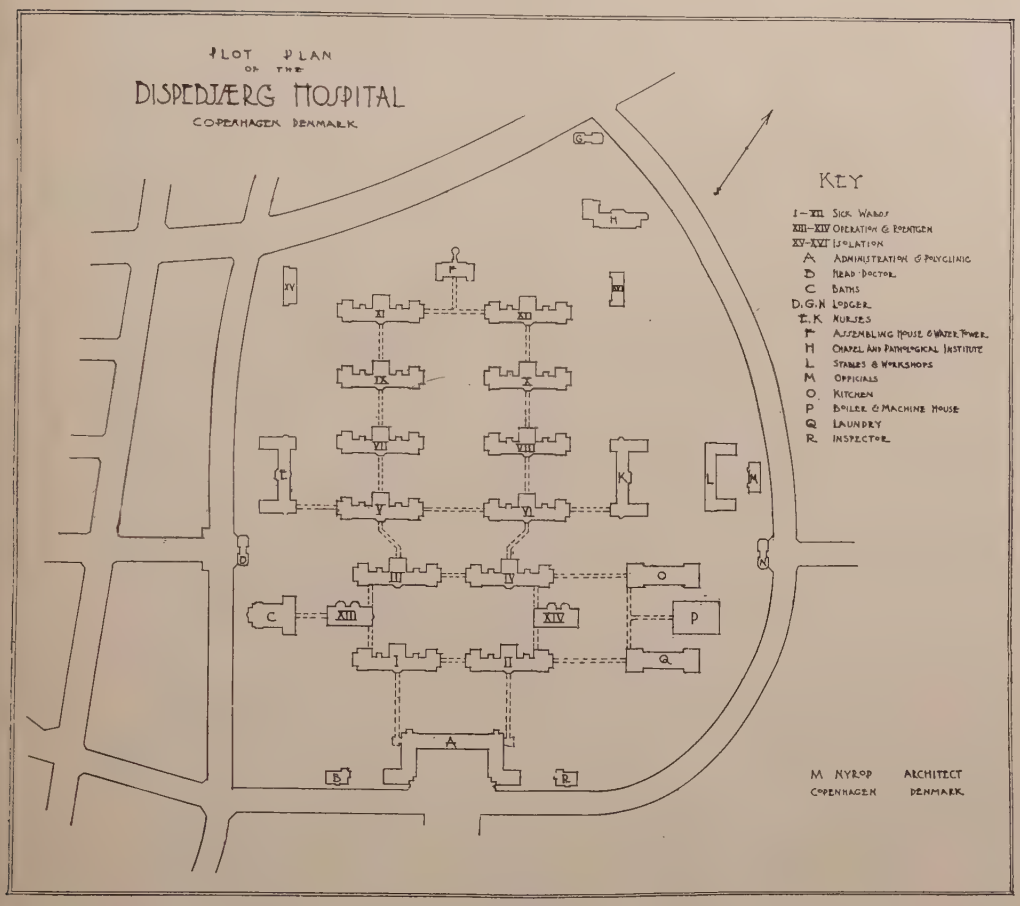



FIG. 4. PLOT PLAN, BISPEBJERG HOSPITAL, COPENHAGEN, DENMARK

and conditions where the pavilion or detached plan may work to the greatest advantage, where servant wages are low, and where climate will allow of open air connections; such a plan adds to the flexibility of the institution, and greatly to the beauty of the grouping. In consideration of heating during the colder months, the concentrated plan has the advantages.

Whether "block," pavilion, or separate buildings, the sacred trust of housing the sick should dictate that the buildings be constructed of non-combustible material. The question is often asked, "What is meant by 'fireproof'?" "Can we build in such a way that we may be made secure against fires?" The term "fireproof" building is somewhat misleading; and while the actual structure may be of non-inflammable material, the doors and windows may be combustible, also the furnishings, bed-clothing, hangings, etc.; to have them other-

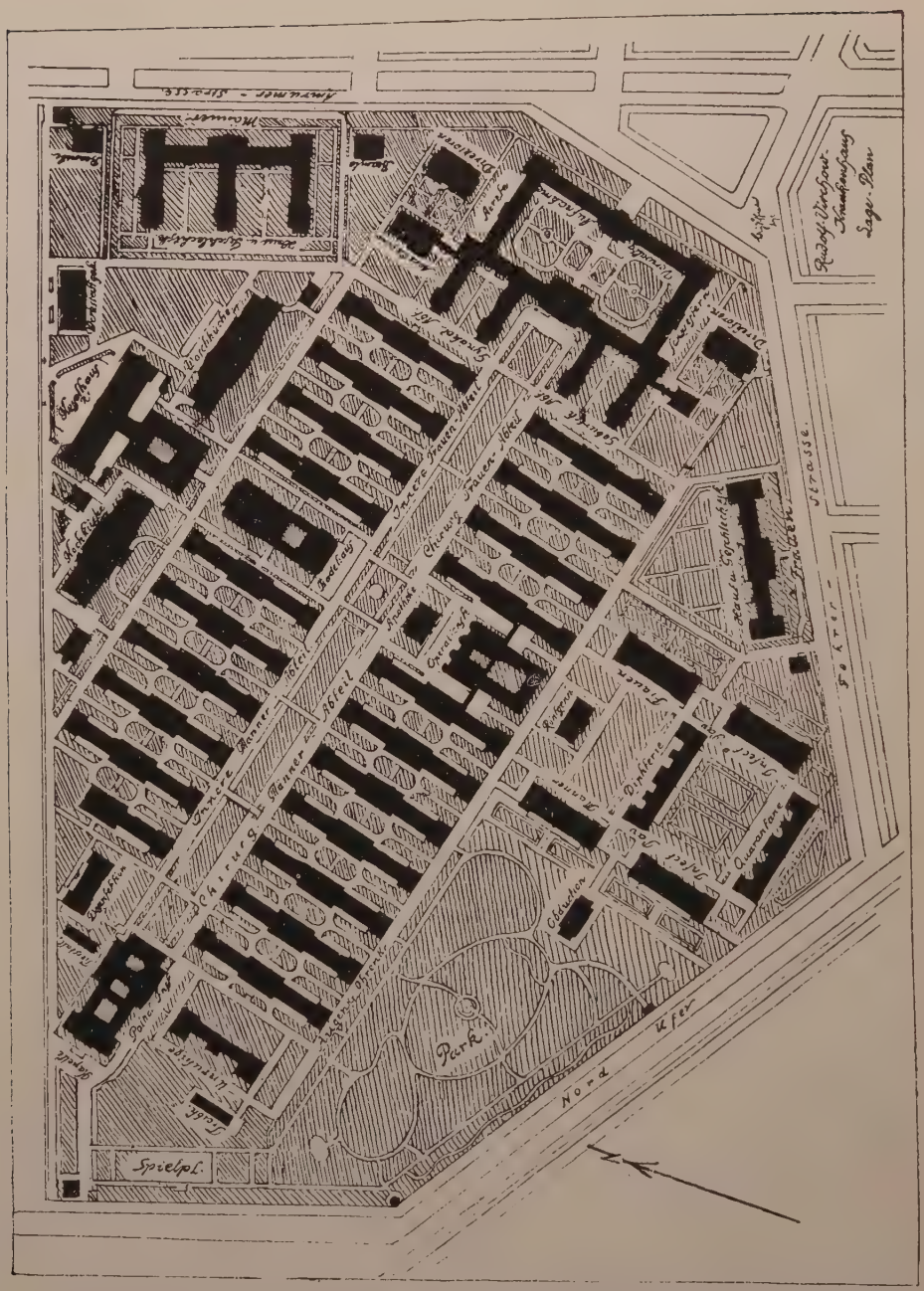



FIG. 5. PLOT PLAN, RUDOLPH VIRCHOW HOSPITAL, BERLIN, GERMANY

wise would make them so ugly and impractical as to more than offset the slight menace of fire.

Whether the buildings are fireproof or not, all hospitals should

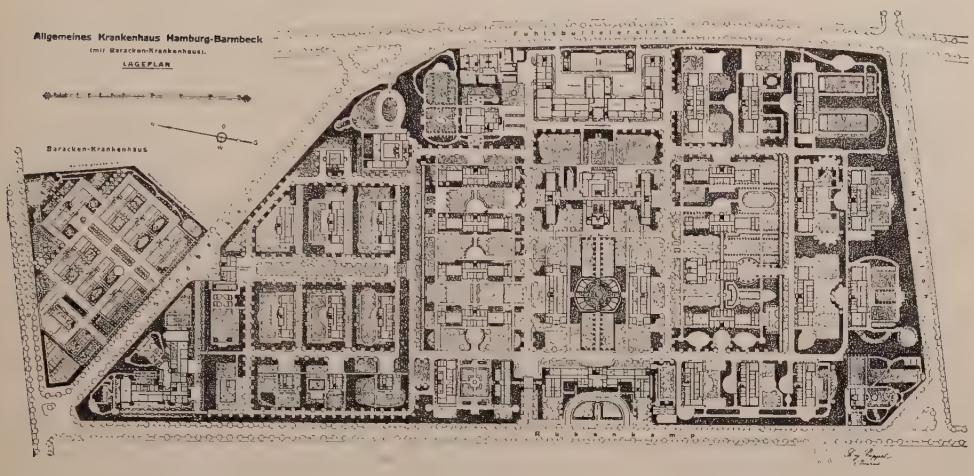



FIG. 6. PLOT PLAN BARMBECK HOSPITAL, HAMBURG, GERMANY

provide ample means of egress in case of fire or panic, and should have enclosed staircases or fire-escapes easy of approach and of ample width.

Fads in construction and equipment come and go. A straightforward solution of any problem in building, and a well thought out plan is better than some untried theory.

Plans and details should be most carefully worked out. In addition, the specifications should be most explicit, in order that some important features be not misunderstood or neglected.

The "basic" principles in hospital planning, as mentioned by Dr. Goldwater,* are so constructive that permission has been asked and granted to publish them here.

"At a time when building costs are extraordinarily high, the temptation is peculiarly strong to lower the standards of planning in the interest of an assumed economy. We are in the midst of such influences today, and the time seems opportune to direct attention to the underlying principles of hospital planning, namely, unity, diversity, facility of operation, flexibility, health and economy.

"1. Unity.—A well-ordered hospital which is doing advanced and thorough work necessarily contains many clinical and other subdivisions. The specialized character of these sub-divisions readily suggests the splitting of the hospital into many parts. Swayed by departmental interests, the architect is apt to be led away from the fundamental idea that the hospital is an organic unit which cannot

*From report of Committee on Hospital Planning, American Hospital Association, August, 1924.

function vigorously unless all of its departments function in harmony. The tendency of individual departments to detach themselves from the group should be combated in planning a general hospital and the unity of the hospital preserved.

1. Main building.
2. Chapel.
3. Sisters' building.
4. Administration building and apothecary.
5. Benzine building.
6. Operation building.
7. Main bath.
8. Kitchen.
9. Male out-patients' building.
10. Female out-patients' building.
11, 13. Male patients' buildings.
12, 14. Female patients' buildings.
15. Disinfecting building and laundry.
16. Garden and workshop.
17. Machinery building.
18. Animal experiment building.
19. Pathological building.
20. Segregation building.
21. Contagion building.
22. Skin and venereal building.
23. Mental disease building.
24. Children's building.
25. Gynecological building.
26. Janitors' quarters.
27. Director's residence.
28. Public lavatory.
29. Main administration building and residence.
30. Coal house.
31. Building for help of electric plant.

FIG. 7. PLOT PLAN, MUNICH-SCHWABING HOSPITAL, MUNICH, GERMANY

"2. Diversity.—Certain principles of orientation, size, and arrangement are valid, respectively, for a particular department of a hospital, and these principles must be respected. If the architect considers separately each distinctive function and plans for it appropriately, a variety of structural outlines will emerge. If he then proceeds to build for each function, regardless of its place and rela-

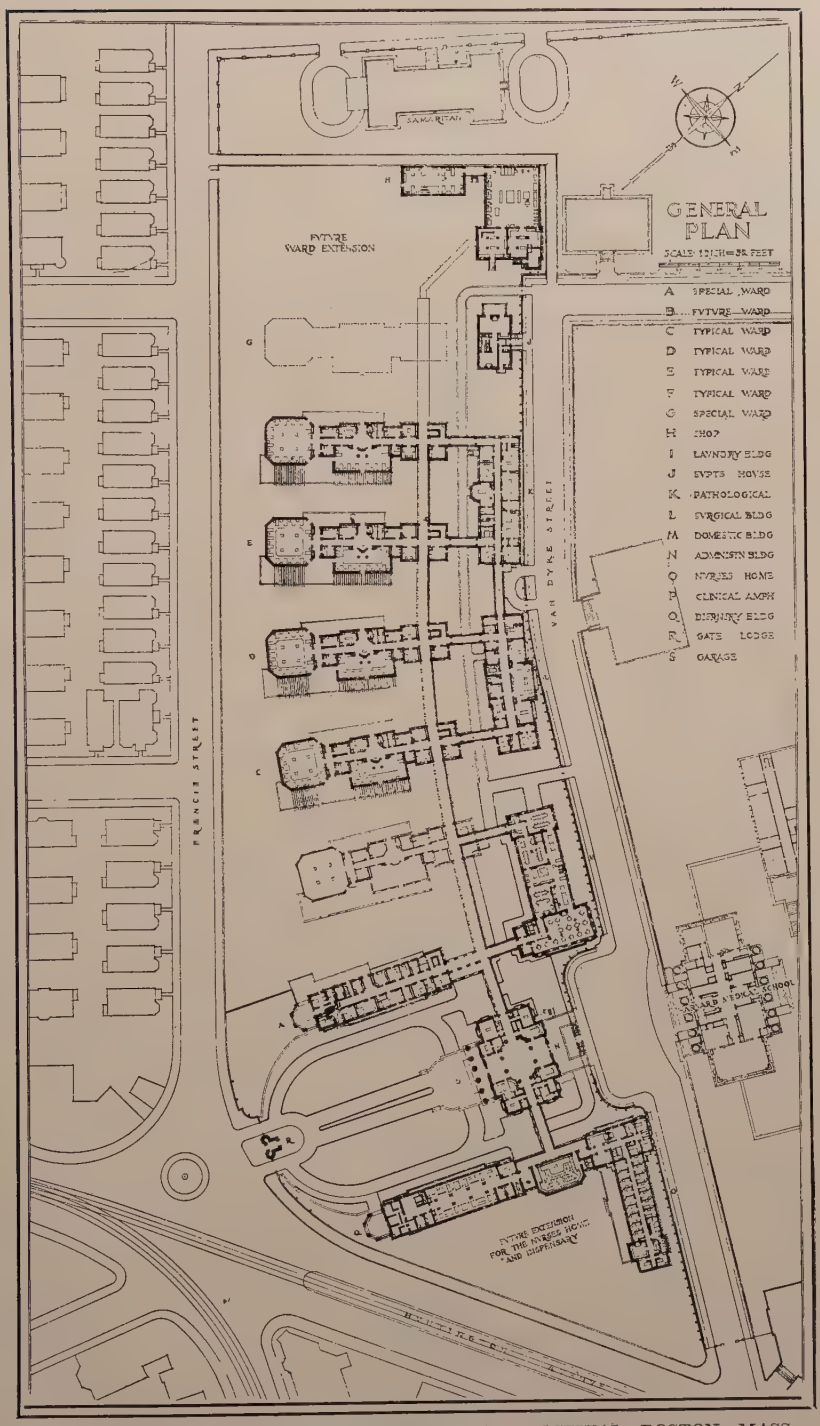



FIG. 8. PLOT PLAN, PETER BENT BRIGHAM HOSPITAL, BOSTON, MASS.
Codman and Despradelle, Architects

FIG. 8A. HARVARD MEDICAL SCHOOL GROUP, BOSTON, MASS.
Showing Peter Bent Brigham Hospital

tions in the general scheme, chaos will result. While the value of diverse forms must be recognized, the necessity of combining these forms into a practicable unit must not be overlooked. On the other hand, if a plan which is simple and which is selected on account of its correspondence to some particular hospital function, the resulting building may be satisfactory in part, but will not give satisfaction as a whole.

"3. Facility of Operation.—The degree of ease with which a hospital can be operated depends on the location of the site, the disposition of entrances and exits, the grouping in space of interdependent departments, and the arrangement or placing of working equipment. The accessibility of the hospital to its clientele is important, and in this connection patients, visitors to the patients, the medical staff, and the nursing staff must be separately considered. Entrances and exits must be conveniently arranged for the groups just named, as well as for domestic employees, for goods, for waste and for the dead. Internal circulation, or transport and service lines, demand the closest study. For example, the wide separation of (a) the supply entrance from the kitchen, (b) the visitors' entrance from the elevators, (c) the visitors' elevators from the nurses' control stations, (d) the operating rooms from the surgical wards, (e) the out-patients' department from the admitting ward or from the radiographic department, (f) the ward utility room or the linen room from the center of

the group of beds to which it is annexed, interferes with facility of operation. These few examples will perhaps suffice to show that an intimate knowledge of hospital service is indispensable in planning, and that the difficulty of applying such knowledge is especially great in the case of large and complex general hospitals, in which service lines cross each other many times.

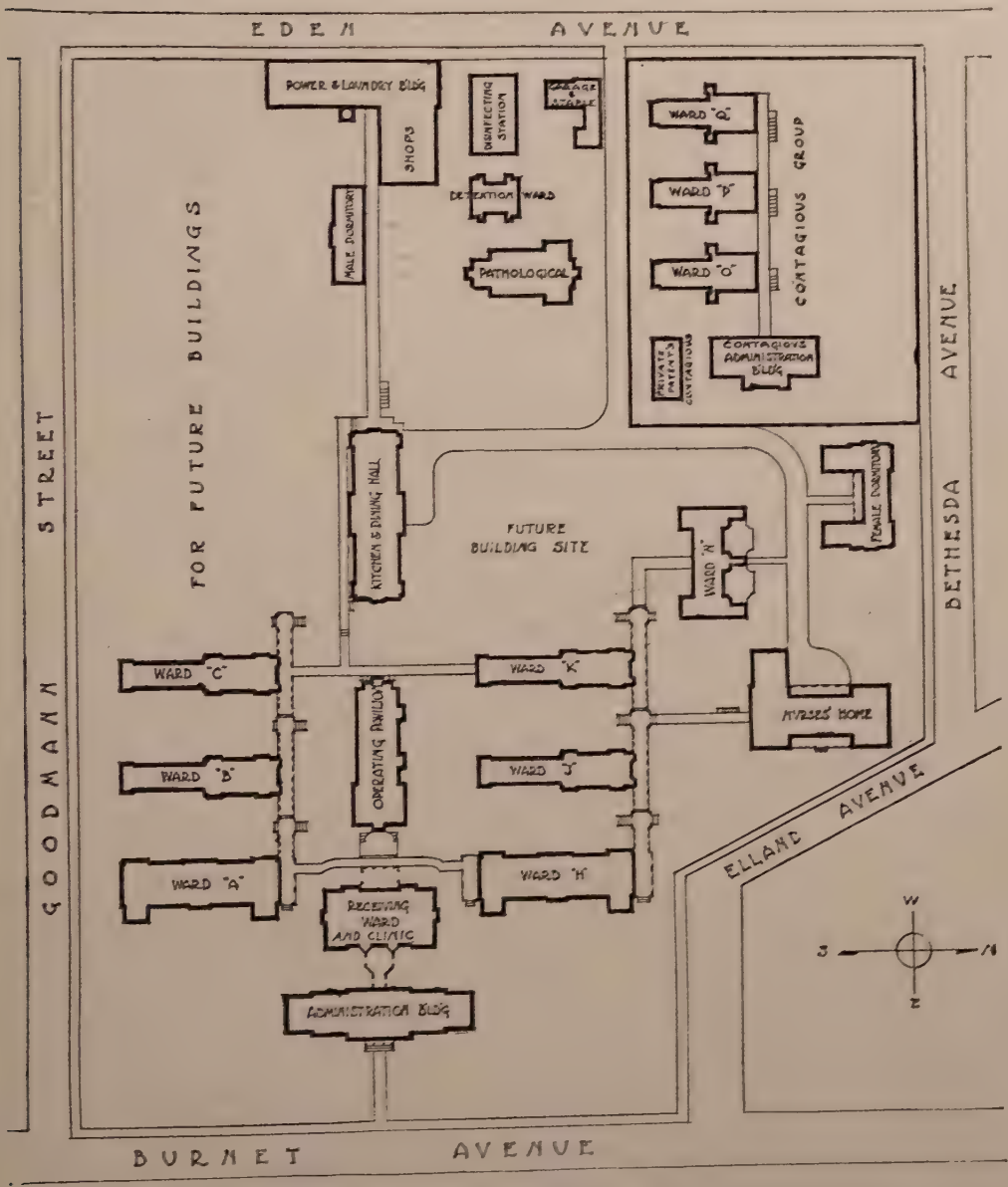



FIG. 9. PLOT PLAN, CINCINNATI GENERAL HOSPITAL, CINCINNATI, OHIO

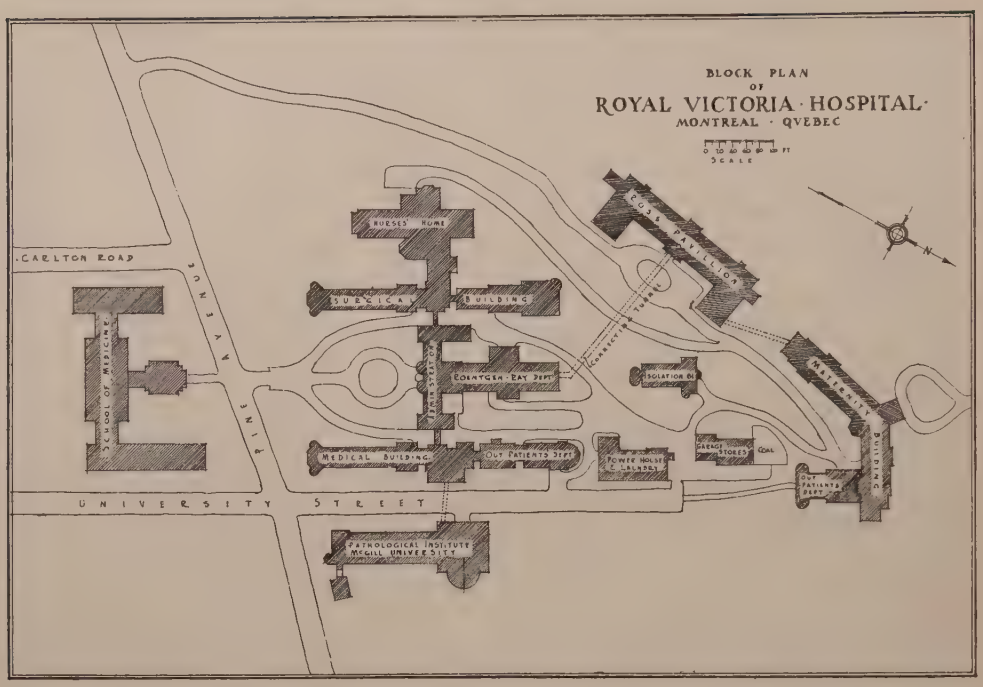



FIG. 10. PLOT PLAN, ROYAL VICTORIA HOSPITAL, MONTREAL, CANADA

"4. Flexibility.—Experience has shown that the conditions which constitute the environment of the hospital are constantly undergoing modifications; social changes, community growth, and scientific discovery create new demands which the hospital is called upon to satisfy. Health hospitals are growing hospitals, but their growth is not necessarily symmetrical. New discoveries are constantly opening up new lines of medical treatment which call for new space-consuming therapeutic apparatus. Nursing standards are forever advancing. Novel forms of record keeping are devised, and presently are regarded as indispensable. A hospital which begins as a medical boarding house is eventually called upon to participate in health education, in the clinical training of medical students, in post-graduate medical teaching, in scientific research. A sudden windfall enables the hospital to add a new or larger maternity department, an orthopedic department, a "tonsils clinic," a children's health center. Pressure is constant, both from within and without, and the hospital must be in a position to accommodate itself to every reasonable demand. An inflexible plan is a forerunner of trouble.

"5. Health.—A hospital which is not rich in health values is a failure. Health values do not reside exclusively in smooth walls,

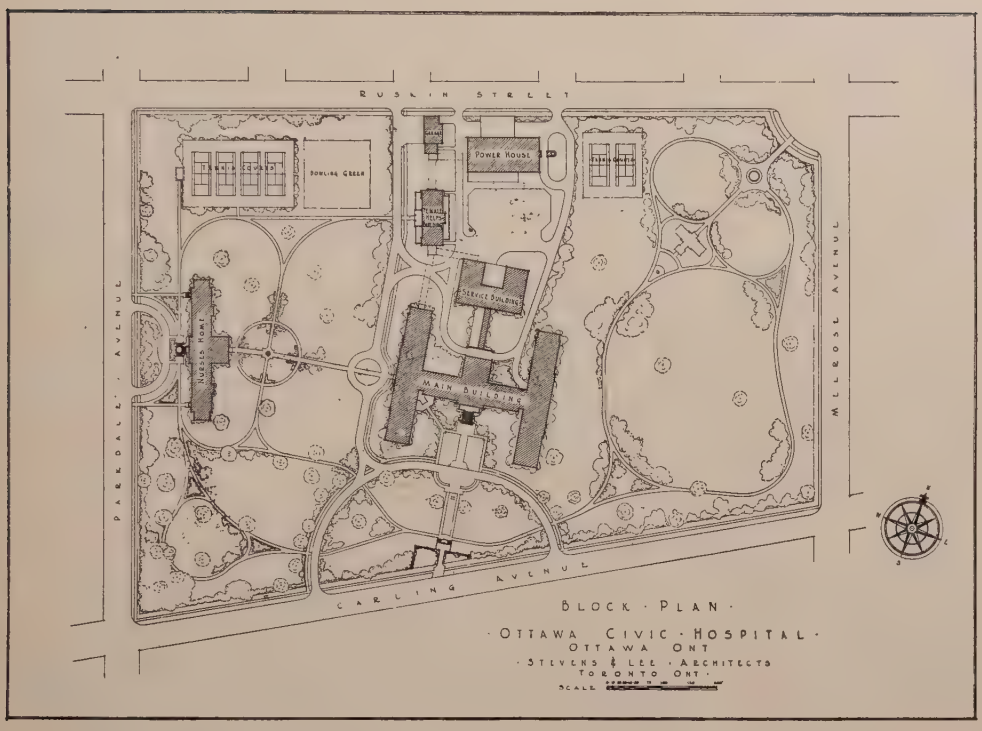



FIG. 11. PLOT PLAN, OTTAWA CIVIC HOSPITAL, OTTAWA, CANADA

smooth floors, and rounded inner corners; they are many and varied, including certain values which tend directly to the promotion of health, such as the proper orientation of wards, the sun exposure of balconies, grounds or flat roofs accessible to patients, effective ventilation, quiet bedrooms for night nurses, advantageously placed dormitories and recreation rooms for the resident staff, proper sleeping quarters for other resident employees, a cheerful and tonic outlook; and also features which tend to the prevention of disease or the mitigation of suffering, such as receiving wards, quiet rooms, isolation wards, sterilizing equipment of many kinds, sanitary construction, devices for noise prevention, restful colorings, etc.

"6. Economy in hospital construction includes economy in production and economy in use. It is a mistake to consider building cost apart from maintenance cost. Broadly speaking, economy in use is more important than economy in production. A metal door frame may be cheaper in the end than one of composition, a white metal faucet may be cheaper than a red, a copper cornice cheaper than one of galvanized iron. Durability is not extravagance. Extravagance in hospital construction resides in mere exterior decoration; in the

use for interior finish of costly materials which are not especially durable or easy to care for; in waste of space; such extravagance carries with it the penalty of high maintenance costs.

"Generally speaking, a concentrated institution is cheapest to build and to operate, but extreme concentration and simplicity of design which disregard the diverse demands of varied functions ultimately defeat their own ends; when concentration and simplicity are carried too far, the hospital is forced either to live in a strait-jacket or to cast off its original garment and acquire a new and more appropriate one.

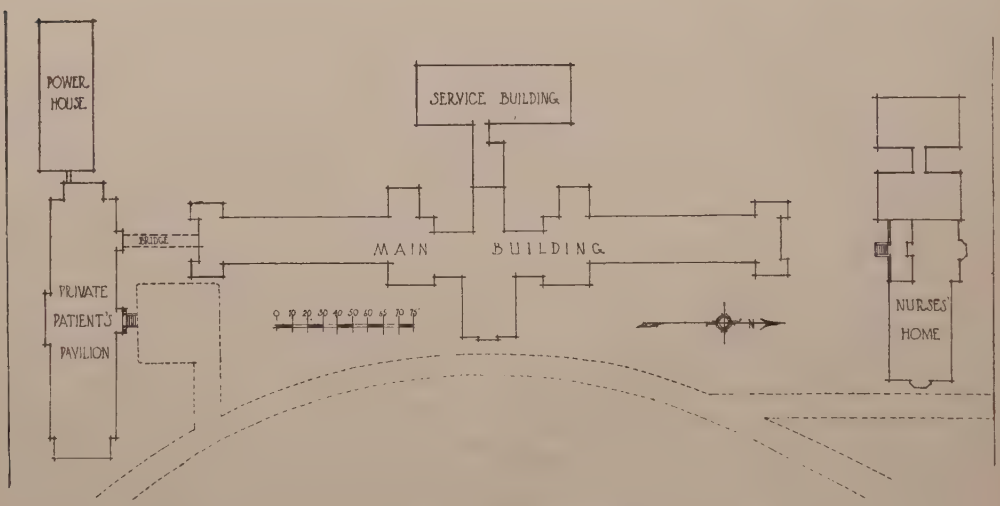



FIG. 12. PLOT PLAN, VICTORIA GENERAL HOSPITAL, HALIFAX, N. S.

"To spend without the assurance of proportionate present or future gain is to be extravagant. An economical hospital is one in which every cubic foot of construction gives the maximum service attainable, under the given conditions."

Hospital planning demands the same careful thought that is the foundation of any modern successful business enterprise. It is essential in the shoe factory, the paper mill, or the business establishment to so plan that the raw materials may be assembled and the finished product delivered with the fewest possible intervening motions. In the hospital the patient, the food and the treatment may be termed the raw material. Whatever conduces to recovery, the convalescent being the finished product, is of business importance in the hospital. The care, the comfort, the convenience and the food, together with the treatment, are the processes of manufacture. The

hospital planner must seek to eliminate here all lost motion or unnecessary work.

In the factory the saving of time in any of the processes adds to the annual product, and in the hospital, likewise, careful scientific nursing, freedom from disturbing elements and everything that can help early convalescence, add to the efficiency of the institution. With the demands for accommodations that are made in these days, any factors that will increase the percentage of hospital capacity will be

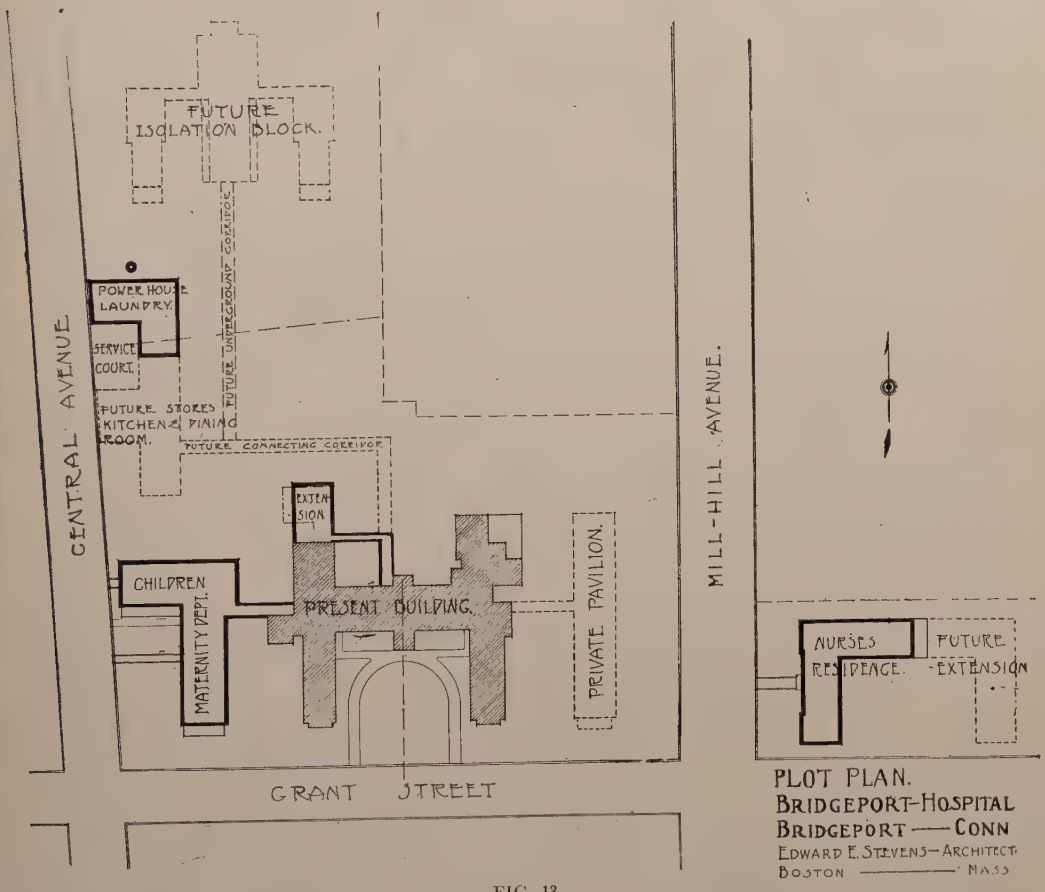



FIG. 13

truly valuable. Location is here most important, an environment that will be an uplift to the patient; an outlook that while distant from industries may still remind the patient that he is a part of the world's life and activity; sunlight and ventilation and the modern fresh air balcony; these items and many others are factors toward increased

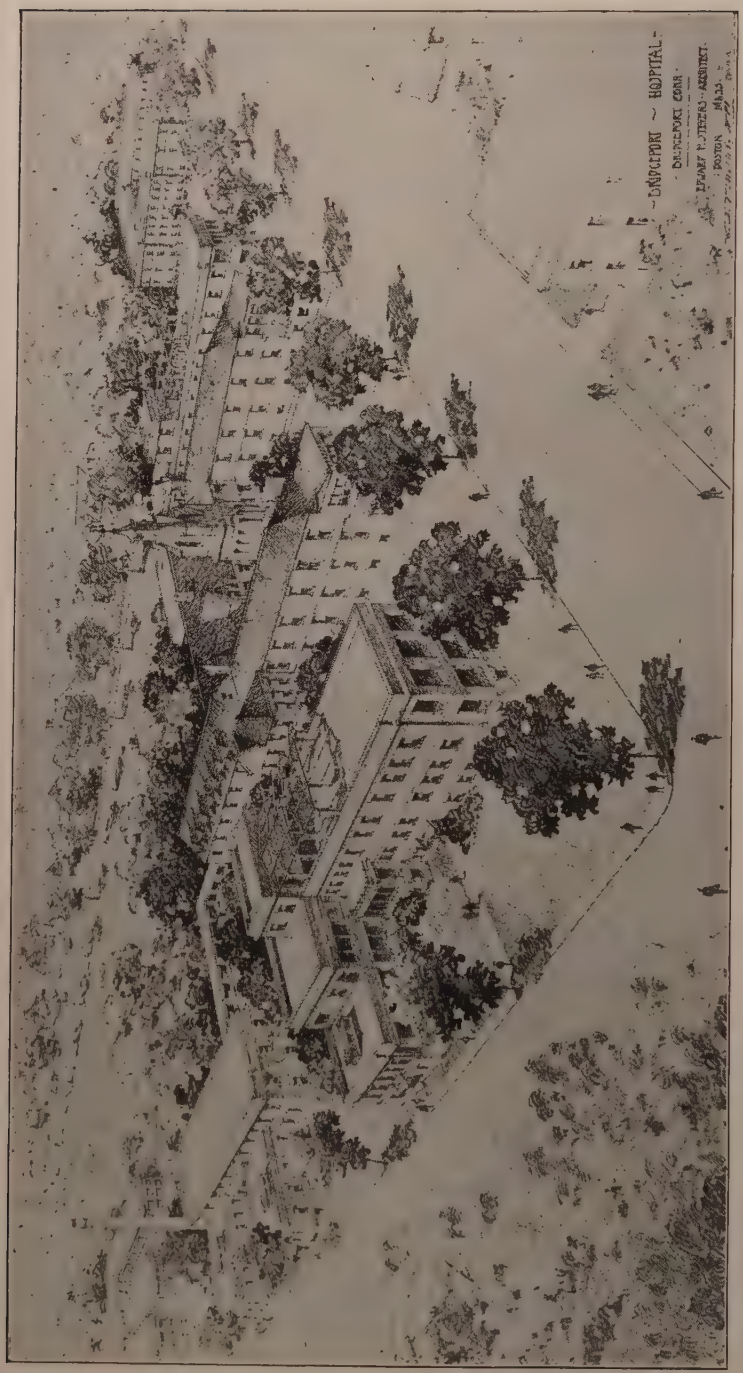



FIG. 14. BIRD'S EYE VIEW OF BRIDGEPORT HOSPITAL DEVELOPMENT, BRIDGEPORT, CONN.

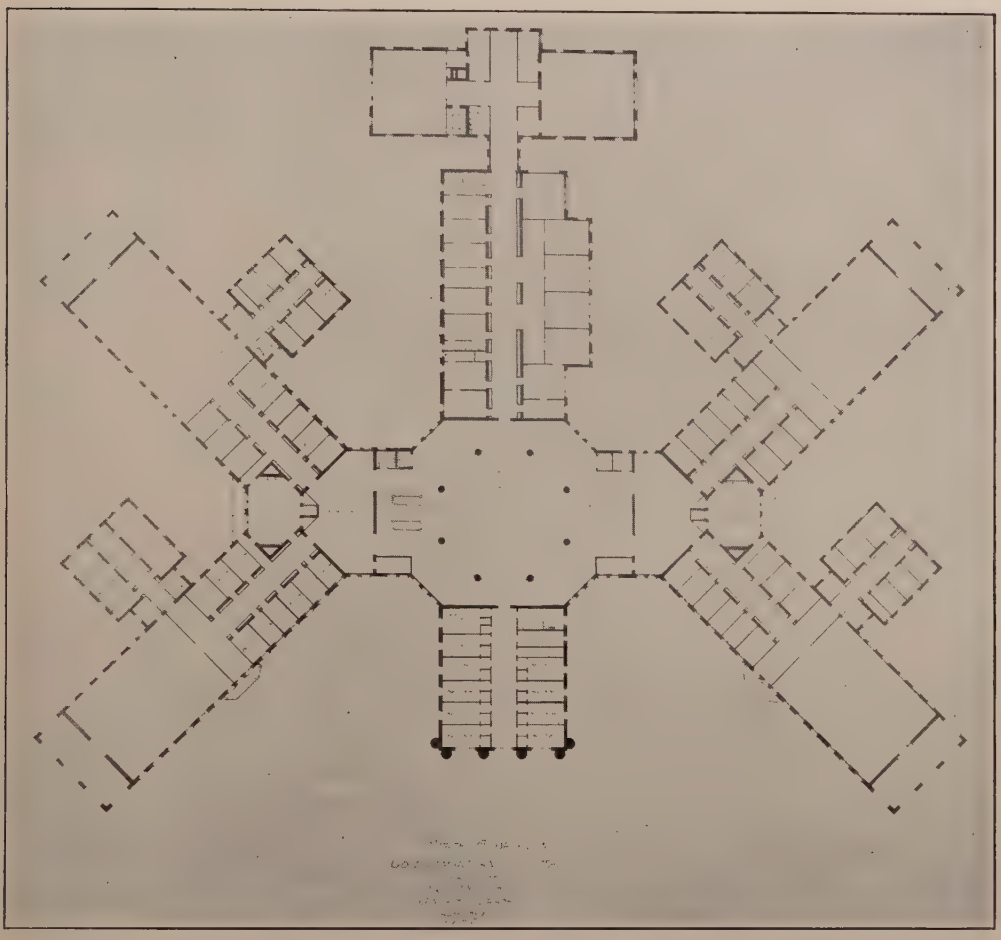
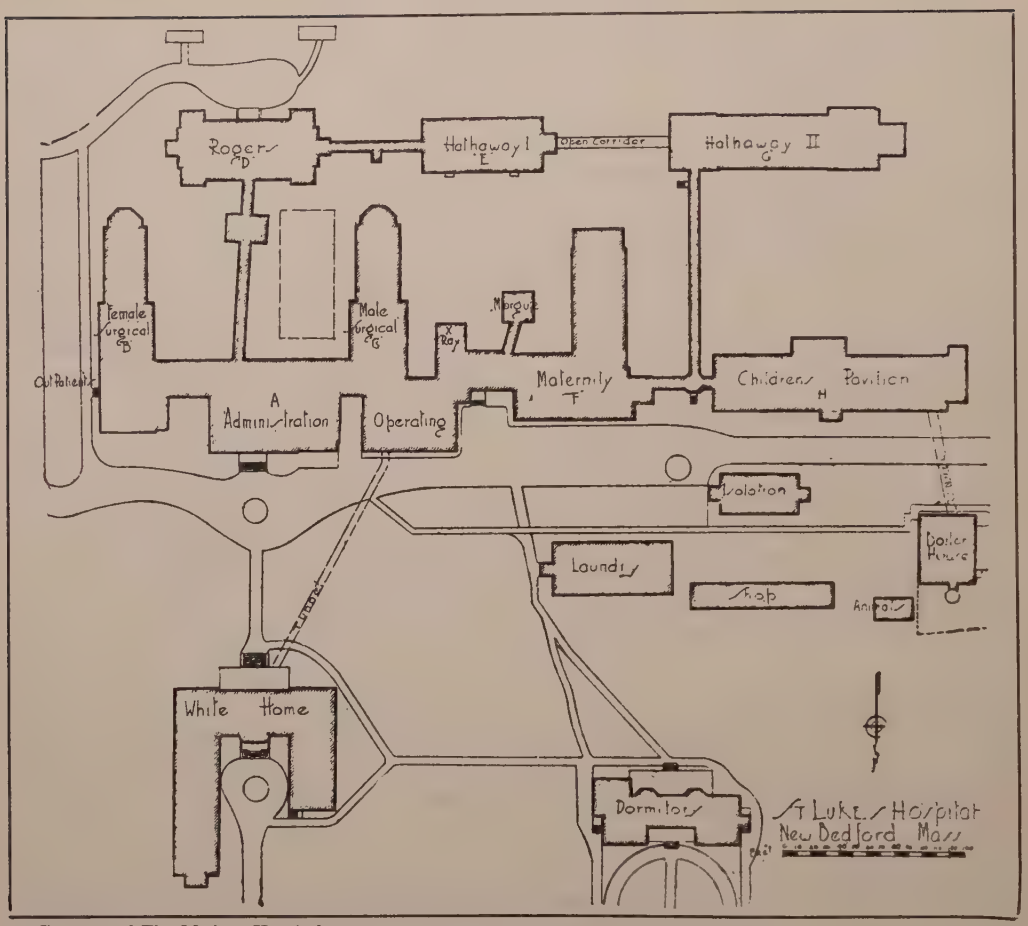


FIG. 15. TYPICAL FLOOR PLAN, GOOD SAMARITAN HOSPITAL, CINCINNATI, OHIO
Gustave W. Drach, Architect

hospital capacity. Internal disturbances should be avoided by planning the noisy rooms at a distance from the wards, and there are many important relations of the utilities to be considered, a single example of which may be the illumination in such a manner as to avoid eye-strain.

Rooms should be used as originally intended, if it is at all possible. Failure to do this is sometimes responsible for the inconveniences which occasion criticism.

*Influence of European Hospitals.* The good influence of European hospitals is shown in many of our modern American institutions. While we would not consider duplicating any one European institution, we do receive from them valuable suggestions for the solution of

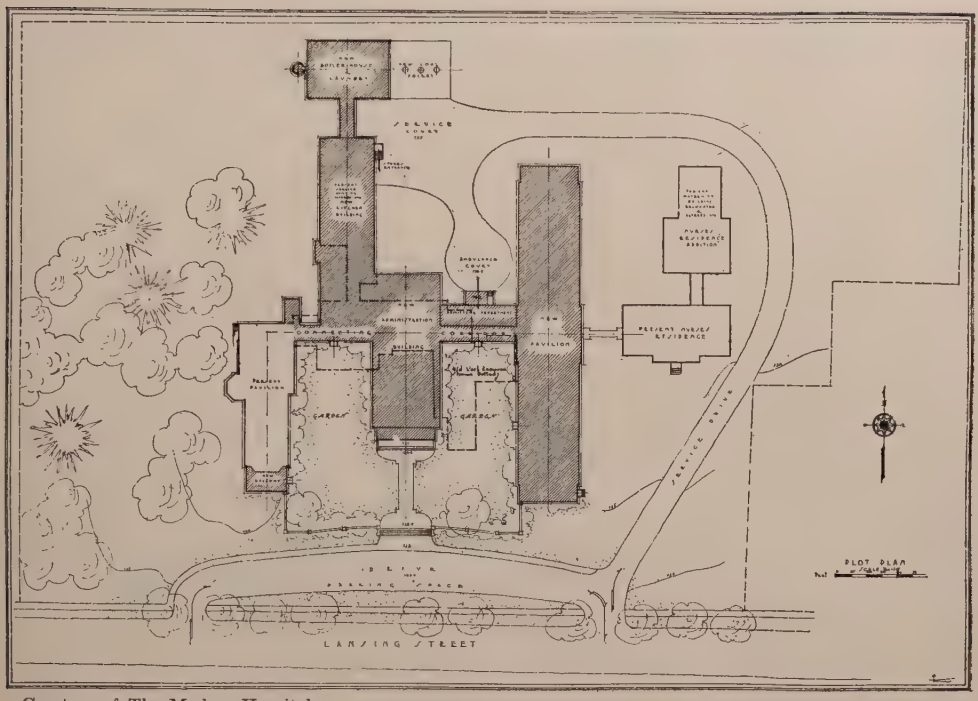



Courtesy of The Modern Hospital

FIG. 16. PLOT PLAN, ST. LUKE'S HOSPITAL, NEW BEDFORD, MASS.

many a perplexing hospital problem. The general relation of one department to another, the method of preparing and serving food, the housing and treatment of patients, the orientation and environment, and the proportion of sunlight and shadow are some of the things upon which we may receive enlightenment. The hospital which would be perfect and which would fulfill the climatic conditions of southern France, however, would be entirely unsuitable in our northern states.

If we can put the European hospital on our dissecting table and remove the part we cannot use, we will still have a pretty good portion of the body left. By this metaphor I do not assume that hospital architecture is a dead subject—far from it. It is very much alive. Only last week our medical coworker asked to have provision made




Courtesy of The Modern Hospital

FIG. 17. PLOT PLAN, AUBURN CITY HOSPITAL, AUBURN, N. Y.
Samuel E. Hillger, Auburn, N. Y., Architect; Stevens & Lee, Boston, Consulting Architects

for a patient in a warm, closed room, with hot baths; yesterday, the same patient was to be kept in the open air; today, ice baths are prescribed; and we must study the clinics very closely to find out what will be wanted tomorrow, for the hospital architect must meet the latest demand.

In one foreign institution we may find the ideal ward unit; in another, a service building of peculiar fitness; and in still another, the perfect floor (although the ideal hospital floor does not seem to have been discovered yet). One institution will have an ideal operating or medical department, while in others the architects will have solved new problems in detail and equipment.

The twentieth century hospital, whether built in Spain, Russia, or the United States, has one common condition in its program—that is, to give the patient the best chance for recovery. If a more thorough study of sanitation, ventilation, nursing, disturbing elements, orientation, and environment, one or all, will help us to design buildings that hasten convalescence and produce the desired results, then that information must be obtained; and, if necessary, we should be willing to circle the globe for it.

FIG. 18. GOOD SAMARITAN HOSPITAL, CINCINNATI, OHIO
Gustave W. Drach, Architect

*Some European Hospitals.* A few examples of European hospitals will show some of the features which have interested the writer in his study of the subject.

The KING'S COLLEGE HOSPITAL, at Denmark Hill, London, is accepted as one of the best English hospitals, and is in very many ways ideal. Its general plan is shown in Fig. 3. It occupies a block of ground in a crowded section of South London. Its present capacity is 600 patients.

The BISPEBJERG HOSPITAL, Copenhagen, Denmark (Fig. 4), designed by Professor Martin Nyrop, has an ideal site containing fifty acres. It is located on slightly rising ground, and advantage has been taken of the natural contours to produce terraces and excellent landscape effects. The design of the group is simple and dignified. There are forty-six buildings, two or three stories high. These buildings, while isolated above ground, are all connected by wide, well-lighted, underground corridors. The bath-house, while far removed from the ward buildings, serves for out patient clinics as well as for hospital patients. The grounds are laid out with special care for the comfort of the patients, with arbors, benches, and fountains.

Perhaps the most familiar of the modern hospitals is the VIRCHOW (Fig. 5) at Berlin. This was built by Architect Ludwig Hoffmann

in 1907, and is of the pure pavilion plan. It has a capacity of two thousand beds. With the exception of two ward units connected with the surgical or operating buildings and the administrative group, the buildings are all isolated and are of one story so far as the patients are concerned. Owing to the ease with which the patients can be taken from the buildings, the beautifully laid-out grounds and parks, with their walks and drives, become the ideal place for convalescents. One of the rules of these parks is that on every third day they are for the sole use of the patients, every third day for the sole use of the staff, and every third day for the sole use of the nurses.

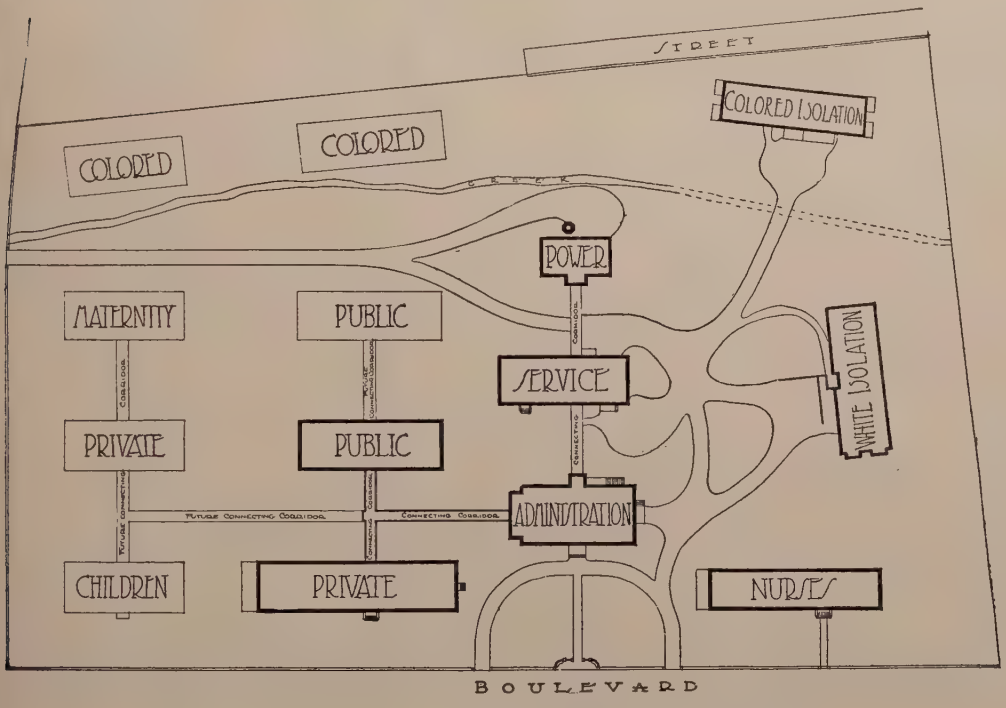



FIG. 19. PLOT PLAN, ST. LUKE'S HOSPITAL, JACKSONVILLE, FLA.

The surgical group, on the left of the main axis, is connected with the operating building, while the medical group has the bath-house occupying the same strategic position. The isolation group occupies a portion of the extensive grounds on the south, and the service buildings on the north.

The ward pavilions, of which there are twenty practically alike, consist of two twenty-bed wards, with service at the center and at the ends, and with room for attendants in the second story of the central portion.

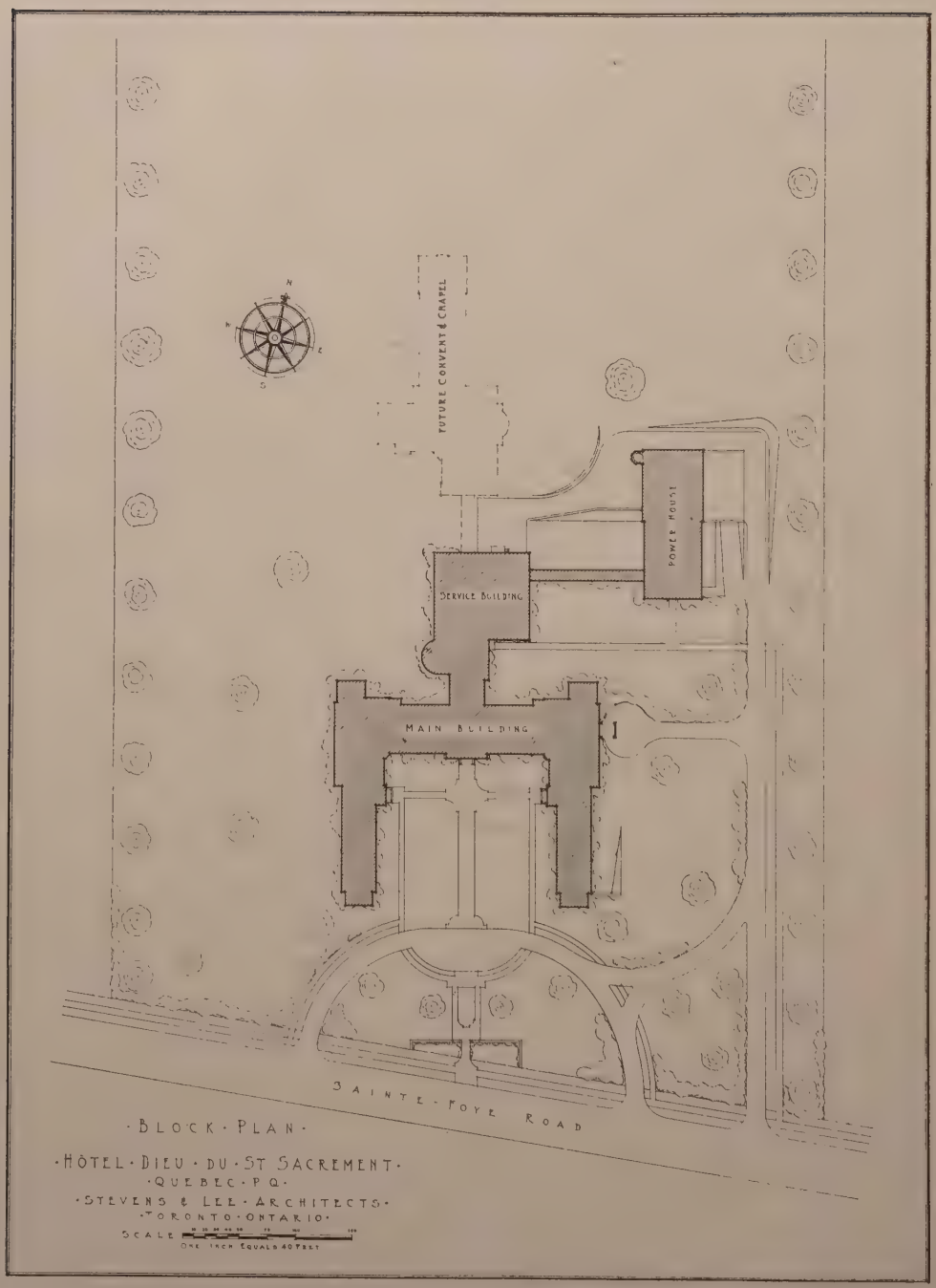



FIG. 19A. PLOT PLAN, HOTEL DIEU DU ST. SACREMENT, QUEBEC, QUE.

The floors of the wards are elevated but little above the ground, giving a ready entrance for the patients and for the food, both of which are carried overground.

The new Barmbeck III, City Hospital at Hamburg (Fig. 6), built by Baurat F. Ruppel, consists of forty-four buildings, and will house fifteen hundred patients. In this plan Ruppel has varied somewhat from his usual method, in placing the center of the medical unit —the bath-house—on the axis of his plan. In the St. Georg, the Eppendorf, the Virchow and other large German hospitals the bath-house is placed on the medical side, balancing the operating building as the center of the surgical side.

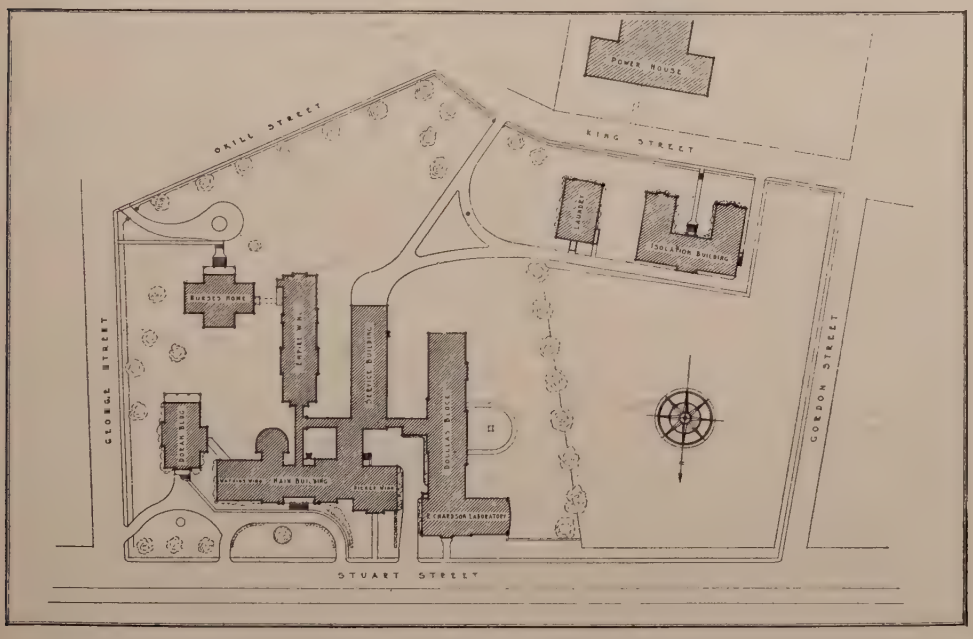



FIG. 19B. PLOT PLAN, KINGSTON GENERAL HOSPITAL, KINGSTON, ONT.

In the Barmbeck, coupled with the medical center, is the patients' entertainment hall, which is used also for a church. On the surgical side, three of the pavilions are connected by corridors, while the fourth is isolated. All other buildings throughout the group are isolated.

One of the most modern and complete hospitals in Germany is Munich-Schwabing (Fig. 7). In this building Architect Richard Schachner has embodied the best of German planning and coupled with it the most valuable of American ideas. While he has separate pavilions, he also has everywhere connecting corridors above ground,

except to the contagious and special treatment buildings, and between these there are underground passageways.

The administration is in the center, flanked by the chapel and the nurses' residence on one side and by the office and the home for the staff on the other. The surgical group has for its center the operating building; and the medical unit, a splendid bath-house. This bath-house is considered the finest in Europe connected with a general hospital, and will be described in another chapter.

FIG. 20. VIEW OF BILTMORE HOSPITAL, BILTMORE, N. C.

*American Hospitals.* The PETER BENT BRIGHAM HOSPITAL (Fig. 8) was created by the bequest of six million dollars from the man for whom it is named.

Perhaps no hospital in America has had more study and thought put into it than has this institution, and the plan is worthy of much study. Under the guidance of the superintendent, Dr. H. B. Howard, the architects and engineers have developed a comprehensive plan which gives the patient every advantage of open air, sunlight, and quick and quiet service.

In planning for the CINCINNATI GENERAL HOSPITAL (Fig. 9), the city was wise in the selection of a site which would give sufficient room for growth. It was also wise in its appointment of the late Dr. Christian R. Holmes as medical adviser, since the time and thought he gave to this institution, after studying foreign and American hospitals, has made it one of the leading hospitals of the world.

The grouping of the buildings of the ROYAL VICTORIA HOSPITAL, Montreal, Canada (Fig. 10), is interesting because of its situation on a hillside overlooking the city. The new private pavilion is the highest building of the group, one hundred feet above the rest of the hospital. Back of it is the patients' park.

In the Notre Dame Hospital, Montreal (Fig. 93), the problem was somewhat unique. The site was a restricted one, and on the south side of the lot an existing building had to be recognized and used to the best advantage. Another element in the problem was the steep grade. An H-shaped building was adopted as giving the maximum amount of service for the available land. Its left wing will not be built at first. Provision is made when it is completed for 500 patients, ward and private. A residence for the Sisters and one for the nurses will be added later.

In locating the Ottawa Civic Hospital, Ottawa, Canada (Fig. 11), careful study was made to secure a high, well-drained site, near the city, of sufficient area to provide for future extensions, and for recreation grounds for patients and staff. Though set in a plot of twenty-three acres, it is a block or self-contained building. Under ordinary conditions, a hospital of two-story, separate pavilions would have been built; but with the present enormously increased cost of building, high wages for the help to care for it, difficulties in getting nurses, etc., a concentrated service is more economical and more manageable.

The H-shaped building, practically two T-shaped buildings, far enough apart for air and sun, is planned as two services, there being no necessity for crossing between the two. Elevators take the place of wagons or carriers overground, thus doing mechanically what would otherwise be done manually. The section of the building (Fig. 91) shows the relation of the various departments. It is as good practice to divide the hospital horizontally as vertically. Separate floors are as disconnected as separated buildings.

The Victoria General Hospital, Halifax, Nova Scotia (Fig. 12), the Bridgeport Hospital, Bridgeport, Conn. (Fig. 13), the St. Luke's Hospital, New Bedford, Mass. (Fig. 16), the Auburn City Hospital, Auburn, N. Y. (Fig. 17) and the Hotel Dieu du St. Sacrement, Quebec, Que. (Fig. 19A), show how additions may be successfully made to existing buildings.

The Good Samaritan Hospital, Cincinnati, Ohio (Figs. 15, 18), is an interesting example of an orientation planned with a view to securing the greatest amount of light and sunshine. The main building, five, and in parts seven stories high, is in the form of an irregular St. Andrew's cross, the center being a huge rotunda. A feature of the plan is the locating of the serving kitchens at the juncture of the wings, each supplying two sections of the building.

The *detached buildings* of many of the European hospitals seem

ideal for the climate for which they are built; but in America, especially in the rugged climate of the northern part, protection must be given the patient in going from building to building, and connecting corridors, at least, are generally provided. In the mild climate of Florida, however, at St. Luke's Hospital (Fig. 19), Jacksonville, it has been possible to build detached pavilions with open corridor connection.

The group will consist of fourteen buildings, eight of which are finished and occupied. The administration building is in the center, with the ward and treatment buildings to the south. There are six or eight of these ward and treatment buildings, only two being now built. The domestic building, containing kitchen and dining-rooms, is directly behind the administration, while the power house and laundry are still farther back. The nurses' residence occupies a position corresponding to that of the private ward. Two buildings for the care of communicable diseases are also provided.

The administration building contains not only the offices of the institution, but also the accident department, the admitting department, and, in the second story, a thoroughly equipped operating department and medical treatment rooms.

The ward unit is planned to eliminate, as much as possible, the general noise of the hospital, and to give an abundance of open-air balconies. The private ward unit has a large open-air ward on the second floor.

The isolation building is so planned that patients can be treated individually, after the manner of the Pasteur Hospital at Paris. (See description in Chapter IX.)

Another example of the detached buildings is the Biltmore Hospital (Fig. 20), planned to be erected on the crown of a slight elevation with the pavilions grouped around the operating building and connected one with another. The service building is at the front of the group, flanking the administration building on the left and balanced by the pathological building on the right.

The isolation building and the T. B. building are at the south and the nurses' residence at the north.

*Memorial Buildings.* A hospital building or ward is certainly a most satisfactory memorial to anyone, since it is one which functions twenty-four hours in a day, every day in the year. As a memorial to the men who died in the World War there would seem to be no more fitting monument. In it should be placed the tablets or other records of the names of those in whose memory it was built.

# CHAPTER II

## THE ADMINISTRATION DEPARTMENT

WHETHER it is a large institution or a hospital of twenty beds there must be headquarters for the administrator or director. This department may vary from a single room to a vast building with admitting rooms, waiting rooms and staff rooms.

Upon the size of the hospital depends the size of the administration unit; here not only the bookkeeping and accounting are done, but here also are located the headquarters of the superintendent, the superintendent of nurses, and the social service worker; here the directors of the hospital will hold conferences, the staff rooms and hospital library will be located; here will be the information desk and the telephone switchboard. Under some circumstances a separate building for the administration will function best, and may be combined with lecture rooms, the housing of internes, etc.; but where economy must be maintained, it is generally found that a portion of the entrance floor of the hospital can best be utilized.

From careful observation, it would seem desirable to have the administrative unit the center through which all patients (except stretcher cases) and all their friends shall pass, and where the general business of the institution shall be conducted.

Waiting space should be provided for visitors who may come in numbers before the visiting hour. There should be offices of the superintendent, admitting officer, bookkeeper, and superintendent of nurses; the staff and board room, and the medical library. The sleeping and sitting rooms of the house staff and internes can be located in this department building.

In the smaller hospital, the laboratories and Roentgen-ray, the autopsy and lecture rooms, and at times the kitchen department work out most satisfactorily in this unit.

The entrance to this department should be carefully studied from the psychological standpoint, with reference to the effect on the would-be patient. Decoration should play an important part in it. The architect should be allowed to depart from the severe design which characterizes other portions of the building, though over-elaboration should be avoided on account of its obvious expense.

In the entrance hall or rotunda should be located any memorial or other tablets which are desired. These tablets should be so designed

as to be a part of the wall panelling, not merely hung in a vacant space (Fig. 26). A good design is a grate fireplace, with the tablets forming a part of the frieze of the mantel.

The walls and ceiling of the entrance hall may be decorated with bas reliefs or paintings. The furniture should be of a type at once dignified and decorative. The floors may be of tile or marble, with cork tile in the working space for the comfort of the attendants' feet. Exposed radiators should be avoided; they may be concealed behind removable grille work, as in Fig. 29.

The information desk should be in evidence, and should be either labelled or so plainly indicative of its purpose that there shall be

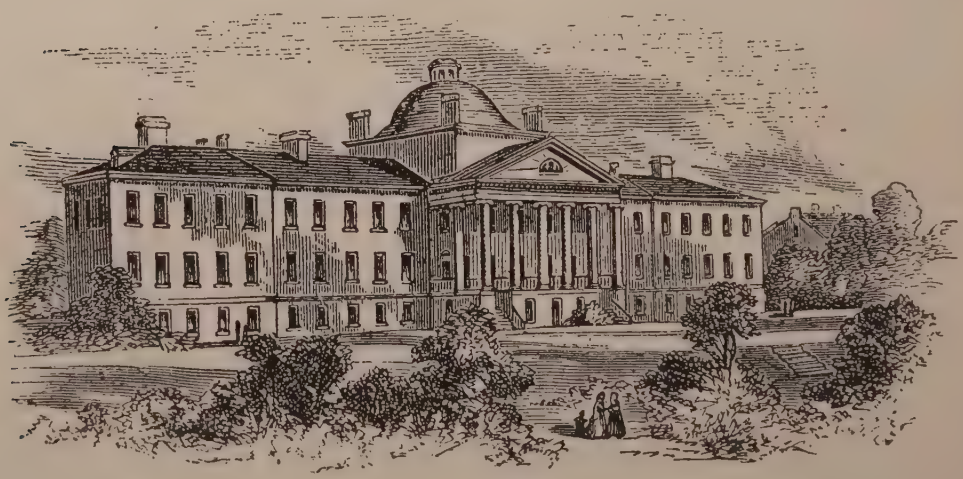


FIG. 21. MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASS.
(From an Old Wood Cut)

no hesitation on the part of the person who enters as to where to go for direction. At this desk there should be every facility for answering questions in regard to the condition of patients, the location of wards or rooms, hospital rules, payments, hotels, restaurants, car lines, trains, etc.

Private telephone booths should be arranged at or near the information desk. A private office should always be provided for the superintendent or director.

To show that a hospital can be successfully run without a so-called administration building, it may be noted that the MASSACHUSETTS GENERAL HOSPITAL, Boston, one of the oldest in the country, built by Architect Bulfinch in 1821 (Fig. 21), did not have an administration building until 1916: so that, with the hundred years

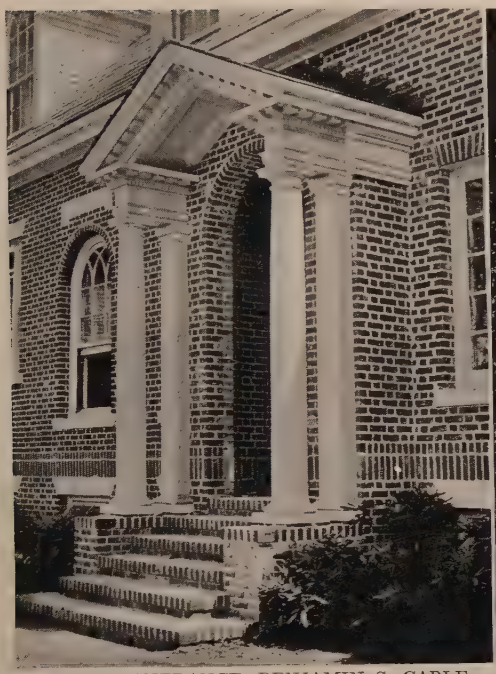


FIG. 22. ENTRANCE, BENJAMIN S. CABLE HOSPITAL, IPSWICH, MASS.

FIG. 23. ENTRANCE, GOOD SAMARITAN HOSPITAL, SANDUSKY, OHIO

FIG. 24. ENTRANCE GATES, ROSS PAVILION, ROYAL VICTORIA HOSPITAL, MONTREAL, CAN.

in which to study the needs, it is not surprising that the plan is well-nigh perfect (Figs. 31, 32).

To the entering visitor, the broad marble information counter at once invites confidence; and with the ample waiting-room in the center and the various offices of the institution around the perimeter, one is not apt to lose his way.

The plan is self-evident. The casualty entrance from the same

FIG. 25. AMBULANCE ENTRANCE, BROCKTON (MASS.) HOSPITAL

FIG. 27. VIEW IN ROTUNDA, PETER BENT BRIGHAM HOSPITAL, BOSTON, MASS.

court comes into the basement (Fig. 32), where there are minor operating and treatment rooms. In the upper stories are the rooms of the staff.

At the Peter Bent Brigham Hospital, the design is more imposing. In the large rotunda (Fig. 27) the circular desk is obviously the source of information. The offices of the superintendent and his assistants, and that of the superintendent of nurses, as well as the admitting and examining rooms, are grouped around the rotunda. In the basement are located the Roentgen-ray department and the pharmacy. The central location of this building, connecting as it does the approach to all departments of the institution, simplifies the problem of surveillance.

In the Ottawa Civic Hospital, Ottawa, Canada (Fig. 86), the administration unit is developed in the center of the H-shaped

FIG. 28. ENTRANCE HALL, BENJAMIN + CARLE MEMORIAL HOSPITAL, IPSWICH, MASS.

FIG. 28. ADMINISTRATION DEPARTMENT, OTTAWA CIVIC HOSPITAL, OTTAWA, CANADA

FIG. 29. ENTRANCE HALL, ROSS PAVILION, ROYAL VICTORIA HOSPITAL, MONTREAL, CANADA

building; two lines of service are designed at the crossing of the pavilions, so that the center portion of the entrance floor need never be made a thoroughfare for the wards in the east and west pavilions. Here a large lobby is provided. The information desk is plainly in view at the right of the entrance, the cashier's desk just around the corner for privacy's sake. The offices of the superintendent, assistant superintendent, and superintendent of nurses are at the rear, somewhat secluded. The record rooms are easily accessible, and there are ample rooms for the clerical force. A doctors' coat room, library, consultation room, etc., are provided.

In this hospital, the admitting department for all patients is on the ground floor. The ambulance entrance is ample in size and entirely protected from the weather. The admitting rooms are near this entrance. There is a separate admitting department for maternity cases. There are two small detention wards for patients coming in at night or those suspected of being contagious.

In the NOTRE DAME HOSPITAL, Montreal (Fig. 93), the main

FIG. 30. ADMINISTRATION BUILDING, MASSACHUSETTS GENERAL HOSPITAL
BOSTON, MASS.
*Coolidge & Shattuck, Architects*

entrance is formal and dignified. The rather simple administration portion is concentrated near the entrance. The wards for patients begin very near to the administration, but are shut off from it.

At ST. LUKE'S HOSPITAL, Jacksonville, Florida (Figs. 35, 36), the administration building houses the operating and accident rooms, the medical treatment, X-ray, laboratory, and the superintendent's and internes' quarters.

At the OHIO VALLEY GENERAL HOSPITAL, which is a block-type, self-contained building, the ground and first stories are set aside for administration and domestic purposes. The main and ambulance entrances, the laboratories and treatment room, the out-patients' and the isolation rooms are on the ground floor (Fig. 107), while the main administrative offices, the internes' quarters, the kitchen and dining rooms are on the first floor (Fig. 108). This concentrates all of the non-profit-bearing portion of the building near the ground and the less interesting outlook.

PLAN OF FIRST FLOOR

1 Main entrance to Hospital
2 Information office
3 Stairs to public toilet for men
4 Waiting room for patients to be admitted
5, 6, 7, 8, 9, 10 Telephone booths
11 Admitting Physician's office
12 Outside corridor to yard
13 Record Clerks' office
14 Corridor to Main Hospital
15 Cashier's office
16 Elevator
17 Bookkeeper's vault
18 Bookkeeper's office
19 Office of First Assistant Resident Physician
20 Office of Resident Physician
21 Trustees' room
22 Private toilet
23 Cleaners' closet
24 Clerks' office
25 Office of Superintendent of Nurses
26 Office of Assistant Superintendents of Nurses
27 Office of Assistant Resident Physicians
28 Telephone switchboard room
29, 30 Reception rooms
31 Office of Assistant Resident Physician
32 Parcel room
33 Main waiting room for visitors
34 Stairs to public toilet for women

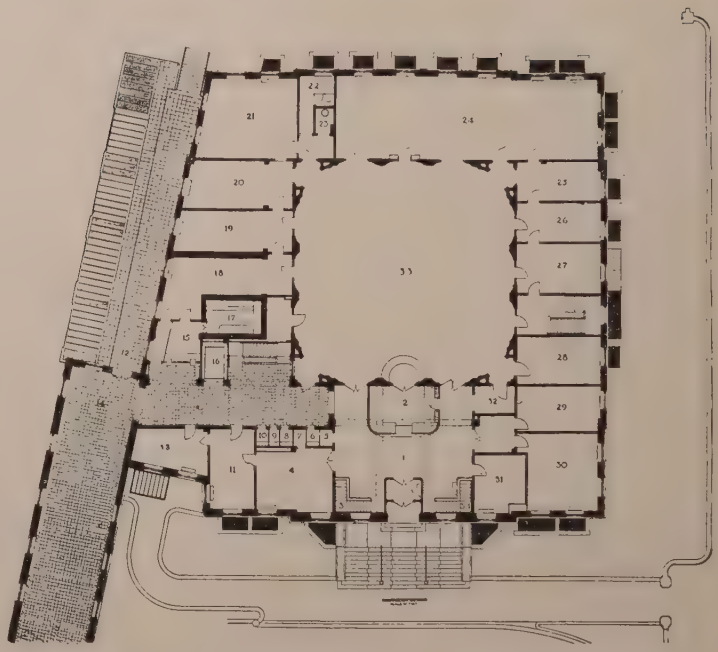


FIG. 31. FIRST FLOOR, ADMINISTRATION BUILDING, MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASS.
Coolidge & Shattuck, Architects

PLAN OF BASEMENT FLOOR

1 Corridor to ambulance entrance
2 Isolation room
3 Dark room
4, 5, 6, 7, 11, 12 Operating and examining rooms
8 Air chamber
9 Splint room
10 Covered incline to possible future buildings
13 Ward service room
14, 15 Male and female emergency wards
16 Ward kitchen
17 Linen room
18 Blanket-warming room
19 Sterilizing room
20 Instrument room and medicine closet
21 Storage vault
22 Disinfecting room
23 Staff dressing room
24 Tunnel under Fruit St., to Nurses' Home
25 Women employees' rest room
26 Women employees' dressing room
27 Patients' toilet (women)
28 Apparatus room
29 Public toilet for women
30 Storage
31 Public toilet for men
32 Cleaners' closet
33 Patients' toilet (men)
34 Emergency-ward bathroom
35 Dressing room for men employees
36 Emergency-ward office
37 Entrance for ambulatory patients
38 Central clothing room
39 Elevator

FIG. 32. BASEMENT FLOOR, ADMINISTRATION BUILDING, MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASS.
Coolidge & Shattuck, Architects

FIG. 34. ENTRANCE, EVERETT GENERAL HOSPITAL, EVERETT, WASH.

FIG. 35. ADMINISTRATION AND OPERATING BUILDING, ST. LUKE'S HOSPITAL, JACKSONVILLE, FLA.

In the Brandon General Hospital, Brandon, Manitoba (Fig. 130), there is a simple solution of a small administration department distinct from yet close to the rest of the hospital. The Everett General Hospital, Everett, Washington, is another. (See Fig. 34.)

In large hospitals, it may be found desirable to have a receiving department located near the administration portion of the building. The Cincinnati General Hospital, Cincinnati, Ohio, has an entire building used for this purpose (Fig. 37), and for ward clinics, an interesting and economical combination.

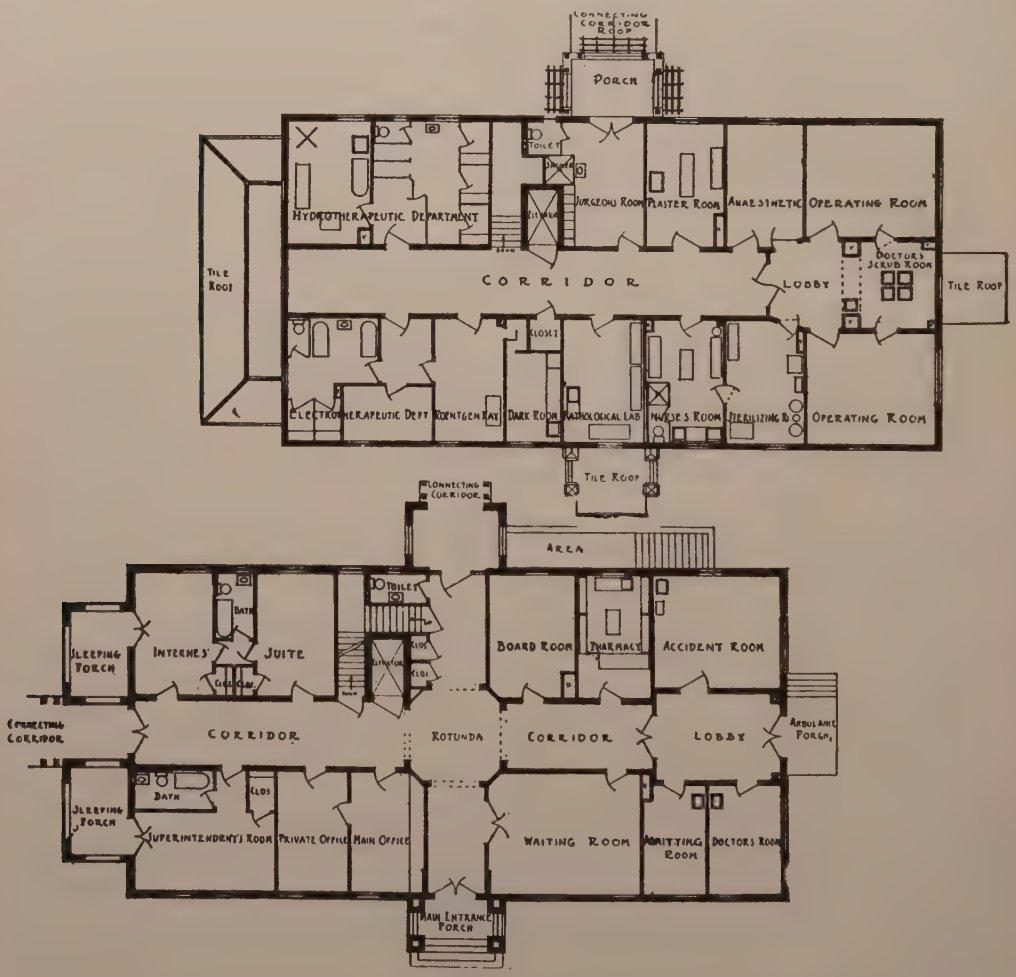



FIG. 36. FLOOR PLANS, ADMINISTRATION BUILDING, ST. LUKE'S HOSPITAL, JACKSONVILLE, FLA.
Edward F. Stevens, Architect; Mellen C. Greeley, Associate Architect

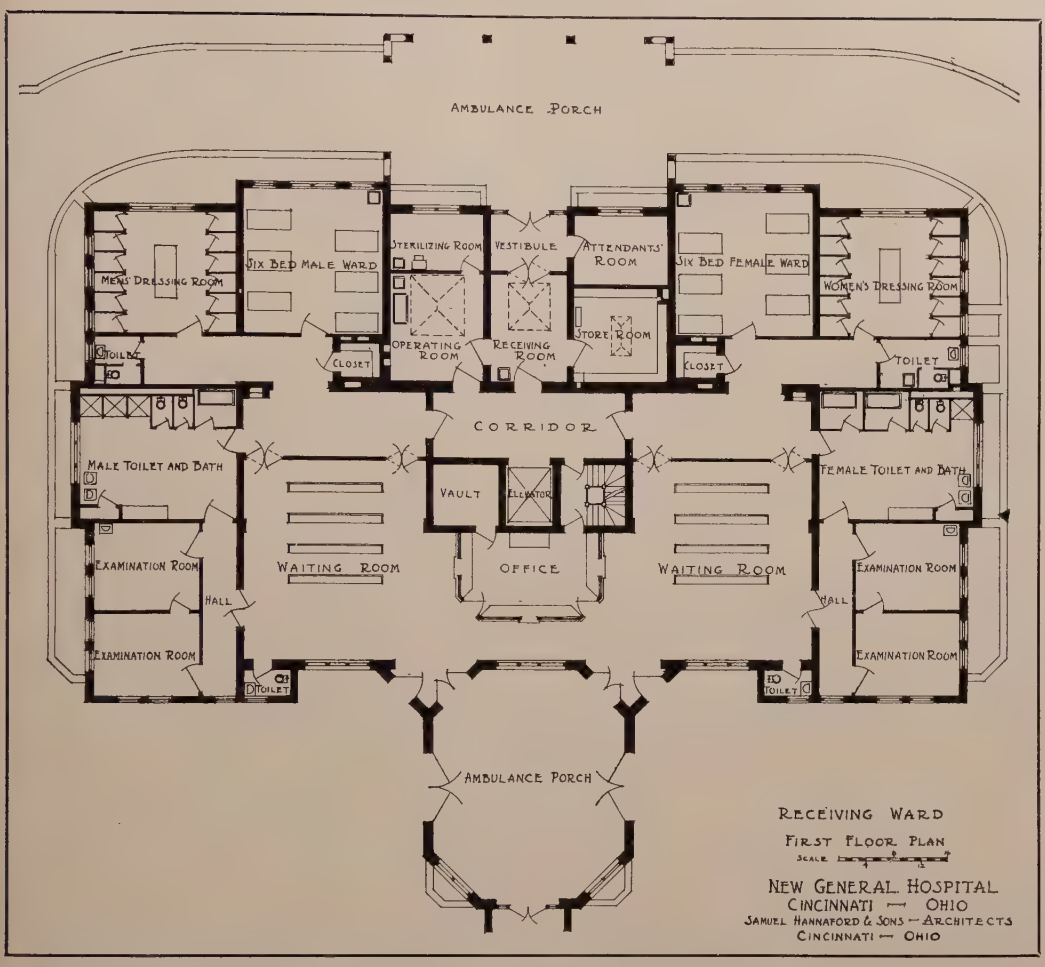



FIG. 37. CINCINNATI GENERAL HOSPITAL

It may be found of advantage to use the same admitting room for both in and out patients, since the out-patient department is sometimes the sifting ground for in-patient material. The ground floor of the NOTRE DAME HOSPITAL of Montreal (Fig. 93) shows an example of this arrangement.

## CHAPTER III

### THE WARD UNIT

THE subject of the ward unit has been discussed by so many able writers on hospital planning that one hesitates to say more on the topic; the ward unit is the keynote of the hospital, since it is here that the patient for whom the institution is built, lives, eats, sleeps, and spends his weary hours of convalescence. We should, therefore, never cease to study the best methods of filling those hours with as much comfort as possible; how to serve him with palatable food; how to provide him with fresh air and sunshine; and how to guard him from undue noise and from the excitement caused by the workings of the hospital.

The planning of the ward unit, whether in a hospital of one hundred or one thousand beds, presents the same problem—how best to care for the patient. After more or less careful study of hospital buildings in Europe and America, after consultation with many of the leading hospital authorities, and after living in the hospital and seeing the operation and treatment, it appears to the writer that there are certain fundamentals which every ward unit should possess—i.e., every ward unit of a general hospital where the surgical, the usual medical, and special cases are treated, or where the general run of cases are cared for. These essentials of planning can be classed under two heads:

(a) *Comfort of Patients.* The comfort and care of the patients are invariably the first thing to be considered. Around this center —*the patient*—we build our institution. If the supplying of more light, better air, and freedom from disturbing noises will add to the comfort and hasten the convalescence of the patient, then these things must be provided.

(b) *Accessibility of Service.* The utility rooms should be so near and so well equipped that the patient need not be called upon to wait for service. At the same time, these service rooms should be so planned that the necessary noises therefrom will not be a menace to speedy convalescence.

*Proportions.* From a careful investigation of modern ward units for the care of general cases—of eighteen to twenty-four beds per floor—it has been found that an average of twenty-five per cent of the area of a floor is needed for staircases, elevators, and utilities, and

FIG. 38. DAY ROOM, BENJAMIN S. CABLE MEMORIAL HOSPITAL, IPSWICH, MASS.

twenty-five per cent for corridors, leaving fifty per cent for patients. Circumstances will, of course, change this proportion. In contagious wards the proportion for utilities will be greater, while in those for incipient tuberculosis it will be less.

The ward unit should be planned for the particular class of disease which is to be treated in it. The conditions which govern the treatment of acute surgical patients are different from those governing chronic medical cases. The ambulatory tuberculosis patient needs different accommodations from the patient suffering with the same disease in an advanced form; the child from the adult; the contagious from the psychopathic case.

There are a few essentials applicable to all classes of cases. Whatever the case (with a possible exception of eye cases), the ward or bed of the patient should be so placed that it is possible to have *sunshine* in the room and near the bed some part of the day. All necessary inside doors and all doors or windows giving access to porches should

be designed wide enough for the patient to be moved in his bed without any change and without any discomfort or inconvenience, to any part of the building, porches, or roof.

As to the number of beds to be placed in a ward, authorities differ very much and local demands vary widely. The best authorities abroad believe that not more than sixteen, or, at the most, eighteen patients should be in one room, and some think that these should be subdivided for a better segregation. The tendency is to reduce the size of wards. In this country there is an increasing demand for

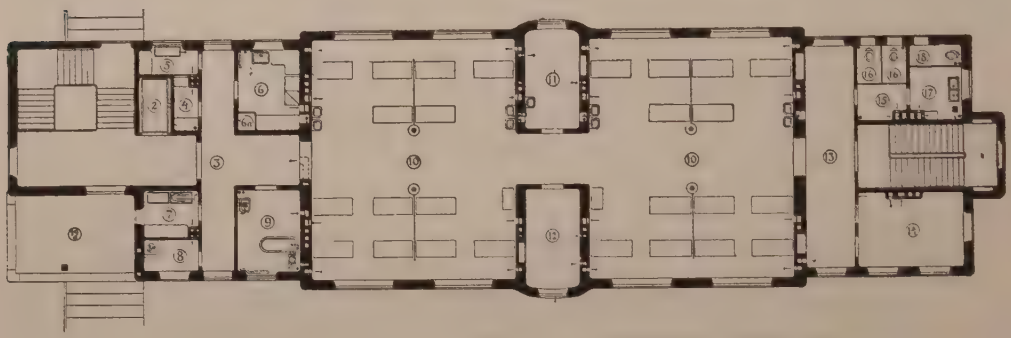


FIG. 39. WARD UNIT, RIGS HOSPITAL, COPENHAGEN, DENMARK

FIG. 40. WARD, UNIT, BISPEBJERG, HOSPITAL, COPENHAGEN, DENMARK

small wards, containing only a few beds. In the west and middle west, paying patients usually prefer private rooms, no matter how cramped in size.

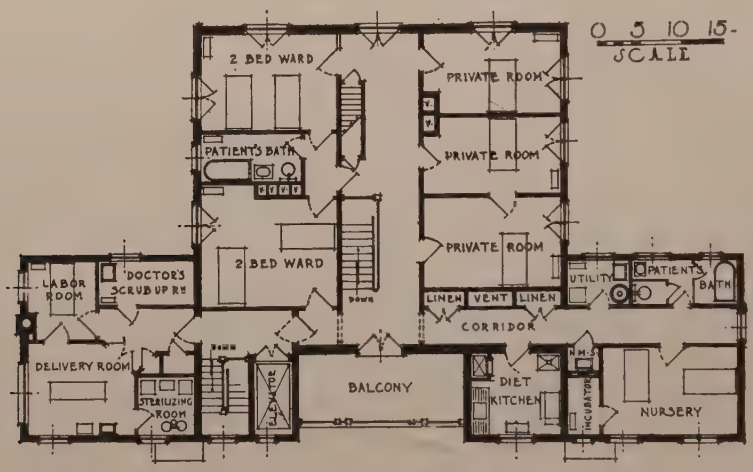
This means that we must meet the economic conditions of nursing, feeding and general administration which obtain in the open ward. The sick patient is to a degree helpless, and needs diligent care and watching, which cannot be as economically given in single rooms as in the open ward. Segregation for social or religious reasons, or

FIG. 41. EXTERIOR OF WARD BUILDING, BISPEBJERG HOSPITAL, COPENHAGEN, DENMARK,
M. Nyrop, Architect

FIG. 42. INTERIOR OF WARD, BISPEBJERG HOSPITAL, COPENHAGEN, DENMARK
M. Nyrop, Architect

on account of disease, age or sex is also desirable. All this means small units, if not single rooms. The "alcove" ward is the nearest solution of the problem.

In wards, every patient should have, when all windows and doors are closed, at least one thousand cubic feet of air. If we consider the height of the ceiling twelve feet, each patient should have not less than eighty-three square feet of floor space—one hundred is better. The height of the ceiling may depend upon the character of the disease being treated, but any height above twelve feet is unnecessary and is of little use in the purification of the air, since the breathing line is about three feet from the floor. On the other hand, for appearance's




Courtesy of The Architectural Forum

FIG. 44. PLAN FOR SOUND CONTROL
Charles Butler, Architect

sake, a ward of more than ten beds should not be less than ten feet in height. The windows should be placed low enough so that a patient either in bed or in a chair can comfortably see the street or grounds.

Where wards are of any considerable size, there should be provided nearby one or more "quiet" rooms for delirious or dying patients. Delirious patients may be protected by furnishing simple iron grilles which can be shifted from one window to another.

Every patient should have at least semi-privacy and some place in which to hide the "household gods" which he may have brought with him.

Many of our modern hospitals, for economy's sake, have a flat roof; and some of them use this roof to a limited extent for the care

1. Ward
1a. Isolation Ward.
2. Lavatory.
3. Patients' Bath Room.
4. Waiting Room.
5. Utensil Room.
6. Continuous Bath.
7. Store Room.
8. Utensil Room.
9. Bed-pan Sink Room.
10. Waterclosets.
11. Disrobing Room.
12. Receiving Bath.
13. Dressing Room.
14. Day Room.
15. Nurses' Office.
16. Serving Kitchen.
17. Laboratory.
18. Examination Room.
19. Lift.
20. Nurses' Toilet.
21. Orderlies' Toilet.
22. Fresh Air Intake.
23. Connecting Corridor.

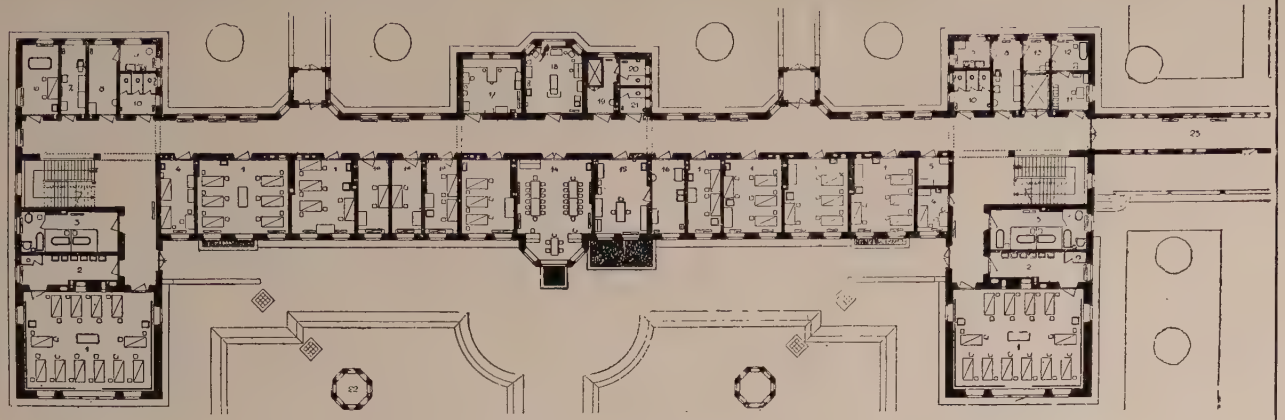
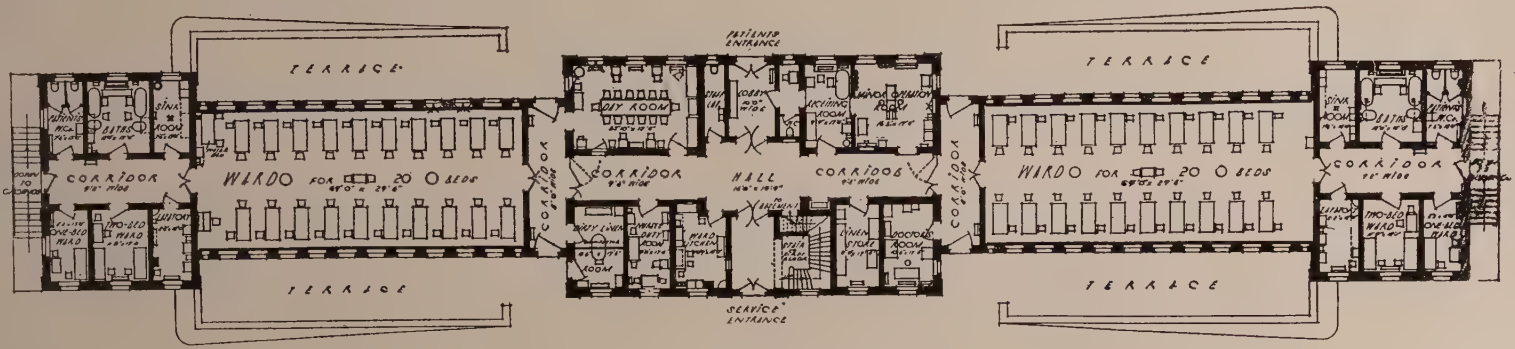


FIG. 43. PLAN OF WARD UNIT, MUNICH-SCHWABING HOSPITAL, MUNICH
Richard Schachner, Architect




GROUND PLAN

FIG. 45. WARD UNIT, RUDOLPH VIRCHOW HOSPITAL, BERLIN, GERMANY
Ludwig Hoffmann, Architect

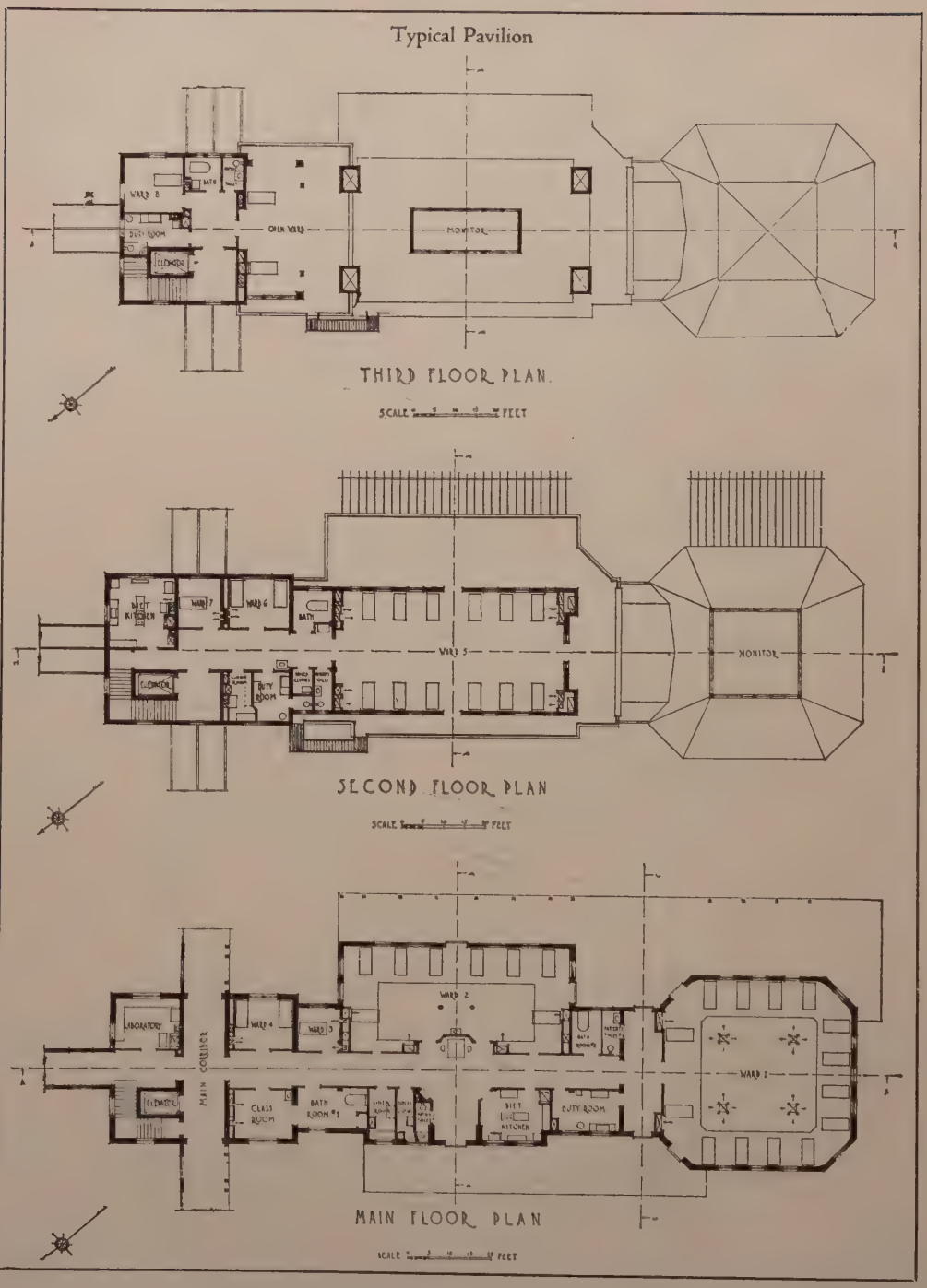



FIG. 46. WARD UNIT, PETER BENT BRIGHAM HOSPITAL, BOSTON, MASS.
Codman & Despradelle, Architects

and treatment of patients. These flat roofs should be used not only for observation, but, if partly covered for protection from storms and intense heat and partly open to the direct rays of the sun, a patient may be given open-air treatment. The regular ward service of toilet, sink room, serving kitchen, and linen and supply room should be provided here.

Intercommunication, not only between one section and another, but between wards and corridors and between one room and another, is an important part of the plan. We should bear in mind that patients are almost hourly being taken through these corridors and

FIG. 47. INTERIOR OF WARD I, PETER BENT BRIGHAM HOSPITAL, BOSTON, MASS.

wards, not as we would walk through a hotel, but either on a stretcher or a bed. For this reason the width of the corridors must be such that a bed 6½ feet long and something over 7 feet in its diagonal may be turned within the corridor. The doors of all rooms in which there are patients should be of sufficient width for these beds to pass; since few beds are less than three feet in width, it follows that the doors must be 3 feet 4 inches to 4 feet wide.

In Europe the day room or convalescent room is considered by the government so important that every hospital is compelled to provide one for each ward or group of private rooms, allowing a little

FIG. 48. INTERIOR OF WARD II, PETER BENT BRIGHAM HOSPITAL, BOSTON, MASS.

FIG. 49. AIRING BALCONY, PETER BENT BRIGHAM HOSPITAL, BOSTON, MASS.

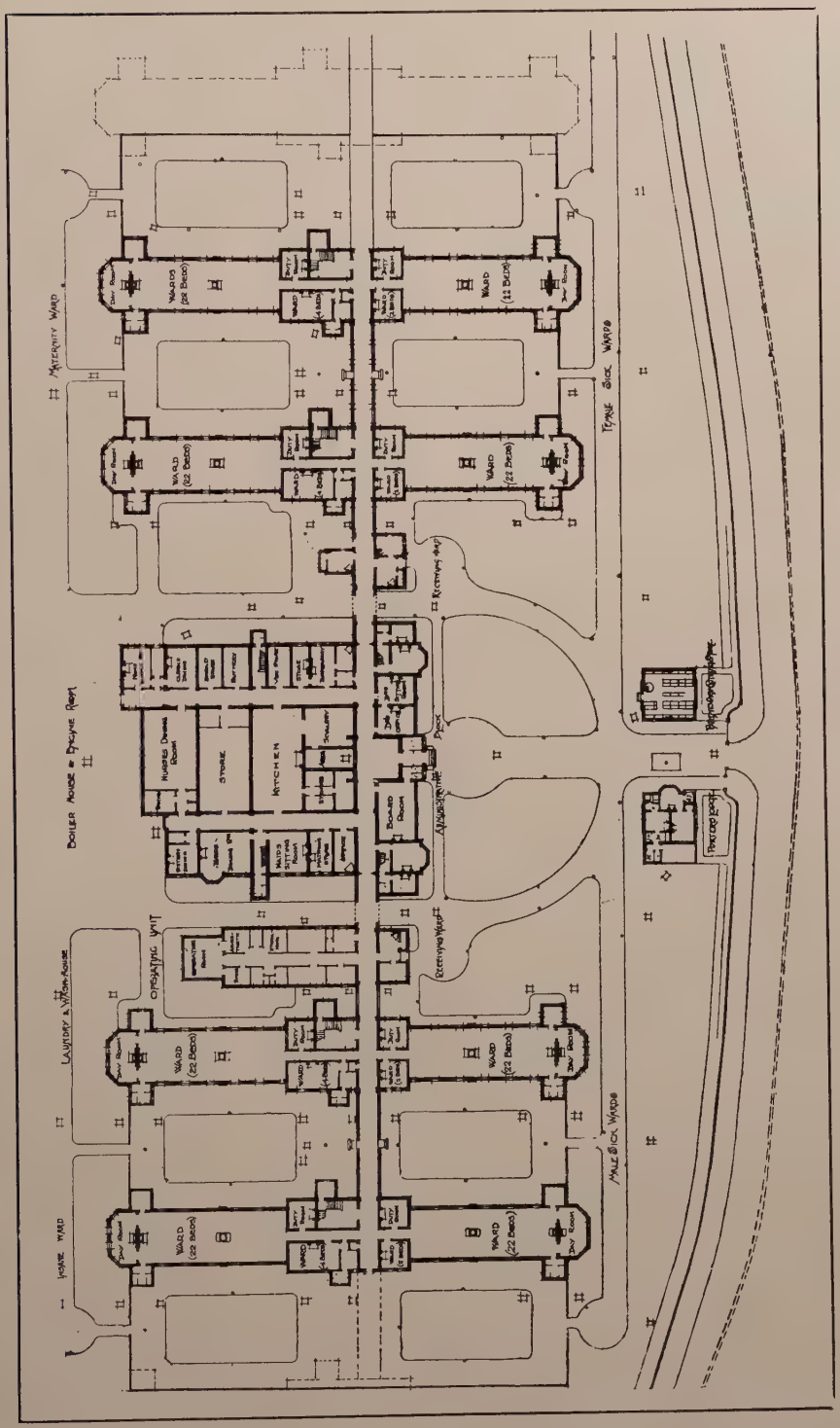



FIG. 49A. PARK ROYAL HOSPITAL, LONDON
A. Sexton Snell & Phillips, F. & A. R. I. B. A., Architects

over nine square feet for each patient, thus making the area of the day room about one-tenth that of the ward or group of private rooms. In some institutions this room is used for a dining-room. The day room for wards allows a separation of the convalescing patient and the really sick patient, to the advantage of each. The day room for private rooms affords a sitting room where the patients can receive their friends, gossip one with another, and get away from the monotony of their own rooms.

*Nurses' Station.* Just where the nurse should be stationed is a matter of much discussion—whether in a chart room set apart, where conferences with doctors or other nurses cannot be heard by the patients, in an enclosed section of the corridor, with observation win-

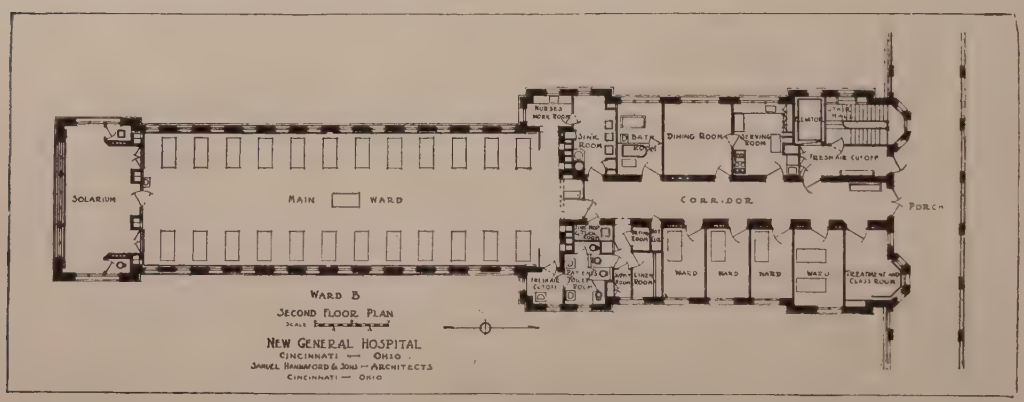



FIG. 50. WARD UNIT PLAN, CINCINNATI GENERAL HOSPITAL, CINCINNATI, OHIO

dows giving a lookout up and down the corridors; in the open corridor where she would have an unobstructed view of the entrances to rooms and utilities; or, as in many foreign hospitals, in the ward itself.

In private room sections, the location makes little difference so long as it is near the center of the group; but with large ward units it should be either in the corridor or in a booth projecting into the corridor, as in the Ohio Valley General Hospital (Fig. 109), or the Ross Pavilion of the Royal Victoria Hospital (Fig. 124). Wherever this station is placed, at that point should be concentrated the annunciator for patients' calls, the telephone and the medicine closet.

Every ward unit, or section of private rooms, should have a serving kitchen of sufficient size, so placed as to allow quick service of palatable food. The common faults of serving kitchens are that they are too small, and that the arrangement of the equipment is incon-

FIG. 51. INTERIOR OF WARD, CINCINNATI GENERAL HOSPITAL, CINCINNATI, OHIO

FIG. 52. WARD BUILDINGS, CINCINNATI GENERAL HOSPITAL, CINCINNATI, OHIO
Samuel Hannaford & Sons, Architects

venient. Such rooms should be carefully planned around the equipment, instead of the equipment being adapted to the room after the building is done. The things most used should be located so as to be most accessible; and the things which are needed together should be adjacent, in order to save time and confusion. There should be facilities for keeping food either hot or cold; for cooking small diets; for laying trays for patients, and for washing the china. (See Chapter XX on "Equipment.")

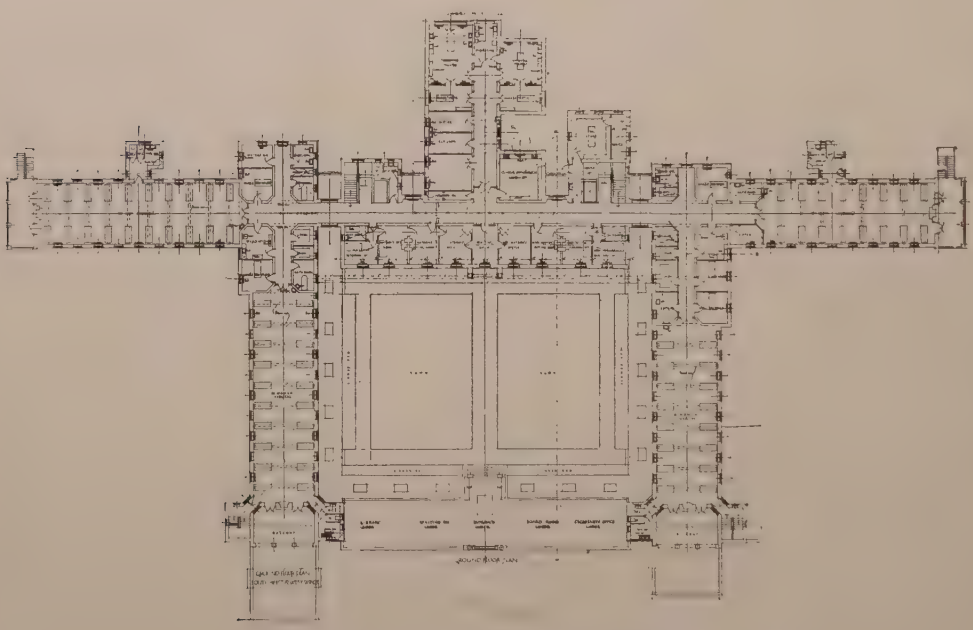


FIG. 52A. FIRST FLOOR, TORQUAY HOSPITAL, TORQUAY, ENG.
F. Percy Adams, F.R.I.B.A., Architect

It is always necessary to have a separate utility room for the emptying, sterilizing, and storage of bed pans and urinals, and such service. The securing of water and the emptying of bed pans are the services most frequently called for, therefore facilities for these must be near by. The soiled clothes' container may be placed here, unless a clothes chute is used. Here, also, should be the gas stove for the making of poultices, the sterilizer for boiling instruments (unless special surgical dressing rooms are provided), the ice-crusher, the small ice storage box, the blanket warmer, etc. If the main utility room is too far away from some portions of the unit, a "sub" sink room, with utensil hopper, table, sterilizer, etc., will minimize travel and expedite service. (See Chapter XX.) A local incinerator is

sometimes found valuable for destroying ward waste, and can be placed in this room.

The utility room and the serving kitchen, on account of their constant use, should have the walls tiled to at least four feet in height, and should be located so as to minimize annoyance from noises.

*Baths.* With acute cases little use is made of the bath tub, so that in a general surgical or medical ward only a limited number is needed, one to fifteen or twenty patients.

In tubercular wards, simple bathing facilities should be provided,

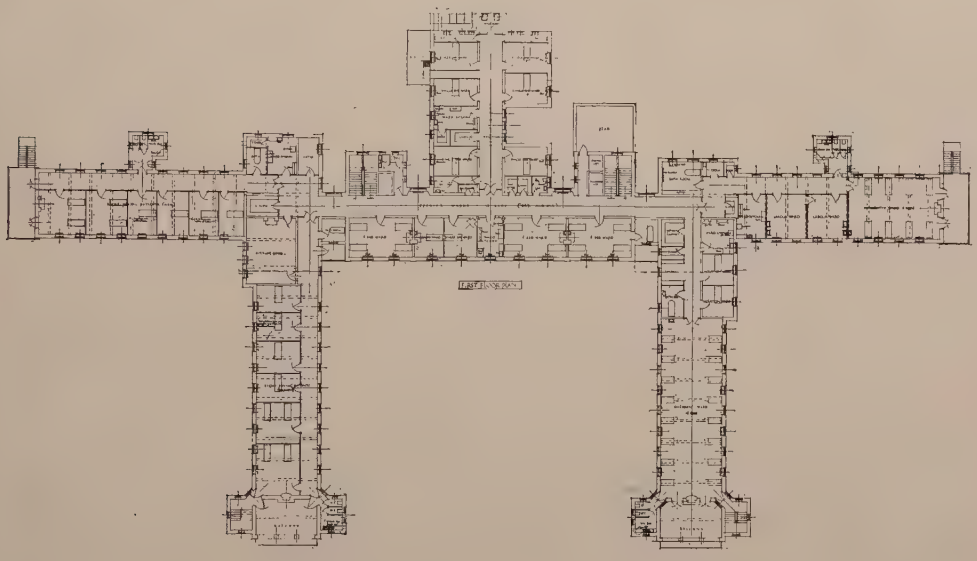


FIG. 52B. SECOND FLOOR, TORQUAY HOSPITAL, TORQUAY, ENG.

both tub and shower, since bathing usually forms a part of the treatment.

For departments where patients need assistance in taking their baths, the tub should be set high above the floor. It should be placed so as to be accessible from both sides. There should be room for a wheel chair.

In children's wards where the bath is always given by a nurse, the high, shallow slab or tub, with spray, should be used. For the ward entrance bath, a similar tub has been found satisfactory. (See Fig. 575 in Chapter XVIII.)

Small medicine closets should be provided in each service. These should have a small sink, and shelves sufficient for the ordinary supply of medicines. (See Fig. 603.)

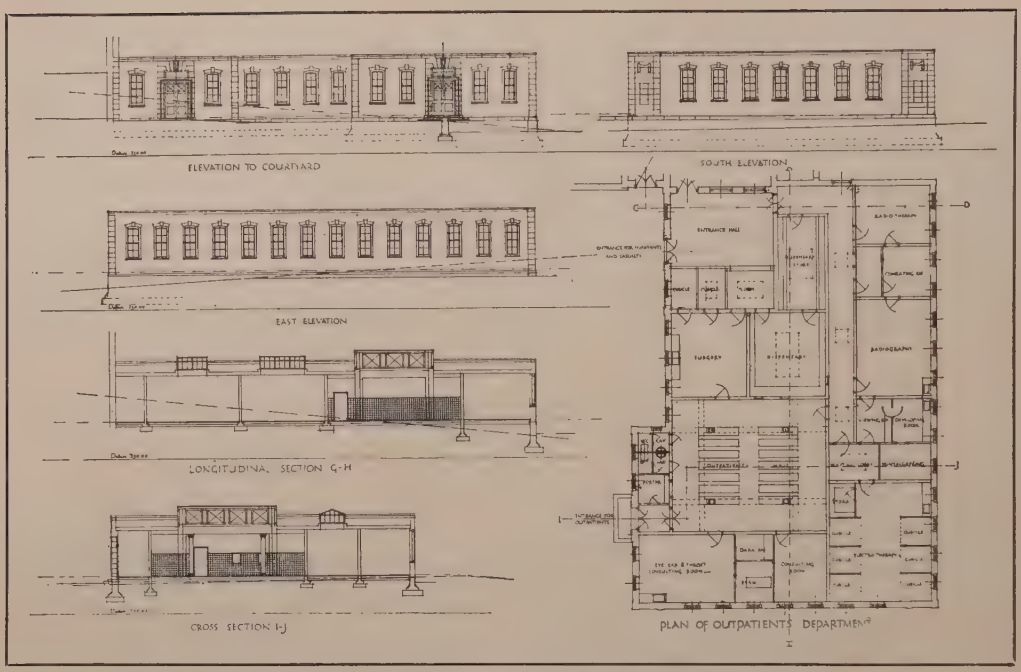



FIG. 52C. OUT-PATIENT DEPARTMENT, TORQUAY HOSPITAL, TORQUAY, ENG.

The linen closet should be well ventilated and lighted. Slat shelves insure better aired linen. (See Fig. 604.)

Where there are large wards, the patients' clothing can be better cared for in a general clothing room. For small wards or private rooms built-in cabinets or cupboards are desirable. The room vents can be carried through this closet. (See Fig. 571.)

In buildings or sections for private patients there should be a dressing and locker room for special nurses.

The necessary toilets must be provided. A small laboratory is often a great convenience. For surgical wards, a properly equipped surgical dressing room is almost a necessity; it saves much dirt and many odors in the ward, and adds to the comfort of other patients. Here all dressings are prepared, all instruments sterilized, and all provisions made for the after-treatment of surgical operations. This room should be of sufficient size to afford good working space around a stretcher.

In the Geisinger Memorial Hospital, Danville, Pennsylvania (Fig. 65), there is a room for preparation and storage of dressings, instruments and supplies, and for surgeons' scrub-up, etc., though the actual dressings are done in the patients' rooms.

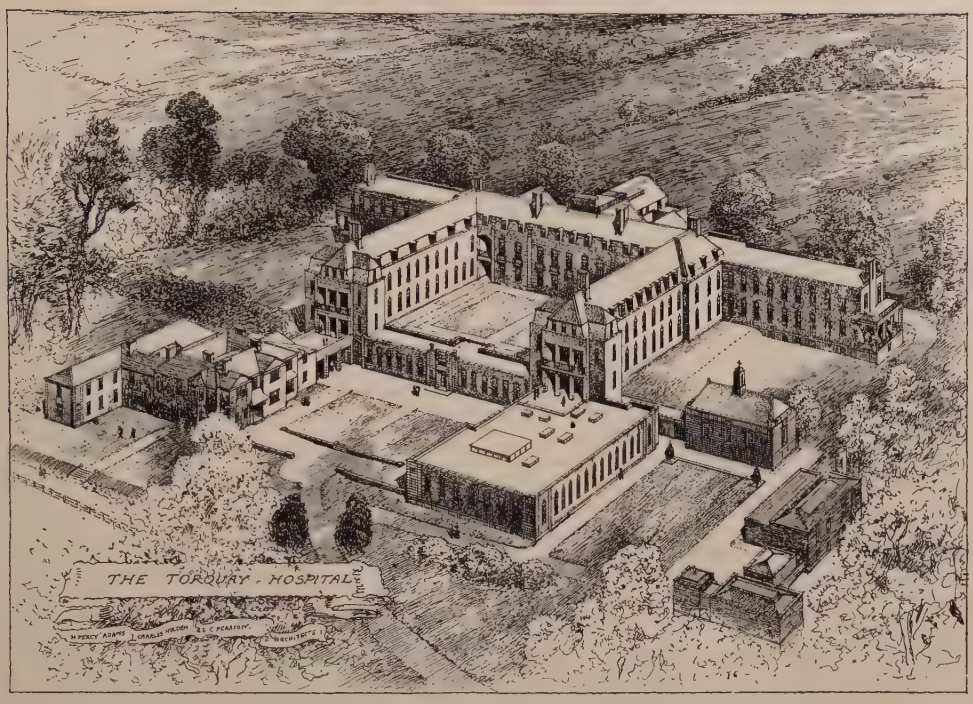



FIG. 52D. EXTERIOR VIEW, TORQUAY HOSPITAL, TORQUAY, ENG.

Where there are many private patients, there should be a small room with sink where cut flowers can be taken at night and rearranged in the morning; this prevents the clutter which one finds in the bath or sink room on morning rounds.

Space should be provided for wheel chairs and stretchers to be set when not in use.

For the convenience of doctors and nurses, lavatories should be placed in every room or in the corridors adjoining. Drinking fountains, preferably of the "bubbling" type, add to the comfort of patient, nurse and visitor.

Sufficient thought is not always given to the provision of reading matter for patients. In some hospitals space is set apart for a hospital library; in others, portable bookcases on wheels (a modified tea-wagon or dressing carriage) are brought to the bedside so that the patient may select his own reading matter.

*Noises.* There is nothing more disturbing to a sick patient than noises; he wants quiet and grumbles if he does not get it. He complains of noises originating both outside and inside the hospital.

Outside noises may be due to the passing of trains or of street

FIG. 38. INTERIOR PRIVATE ROOM, OTTAWA CIVIC HOSPITAL, OTTAWA, CAN.

cars, which can only be obviated by location of the hospital building, or in rare instances by appeal to public officials. Perhaps one of the greatest complaints is in regard to the noise occasioned by parking and consequent starting of motor cars near the hospital. If parking place is located at a little distance, much of this can be eliminated. Bringing in coal or supplies should not be near patients' rooms. Signs reading "Hospital Zone. Shut off your motor." are often helpful.

Unpleasant noises from inside the hospital emanate from steam pipes, plumbing pipes, dish-washing, bells and signals, clicking of door latches and slamming of doors, the rattling of windows, other patients talking or moaning, visitors walking and talking in the corridors. How to prevent or minimize these is the architect's problem.

Noisy steam pipes can be done away with by proper grading of pipes. Much of the noise of discharging plumbing fixtures is attributable to poor selection, poor installation and thoughtless supervision, or sometimes to high water pressure—easily reduced by a shut-off valve.

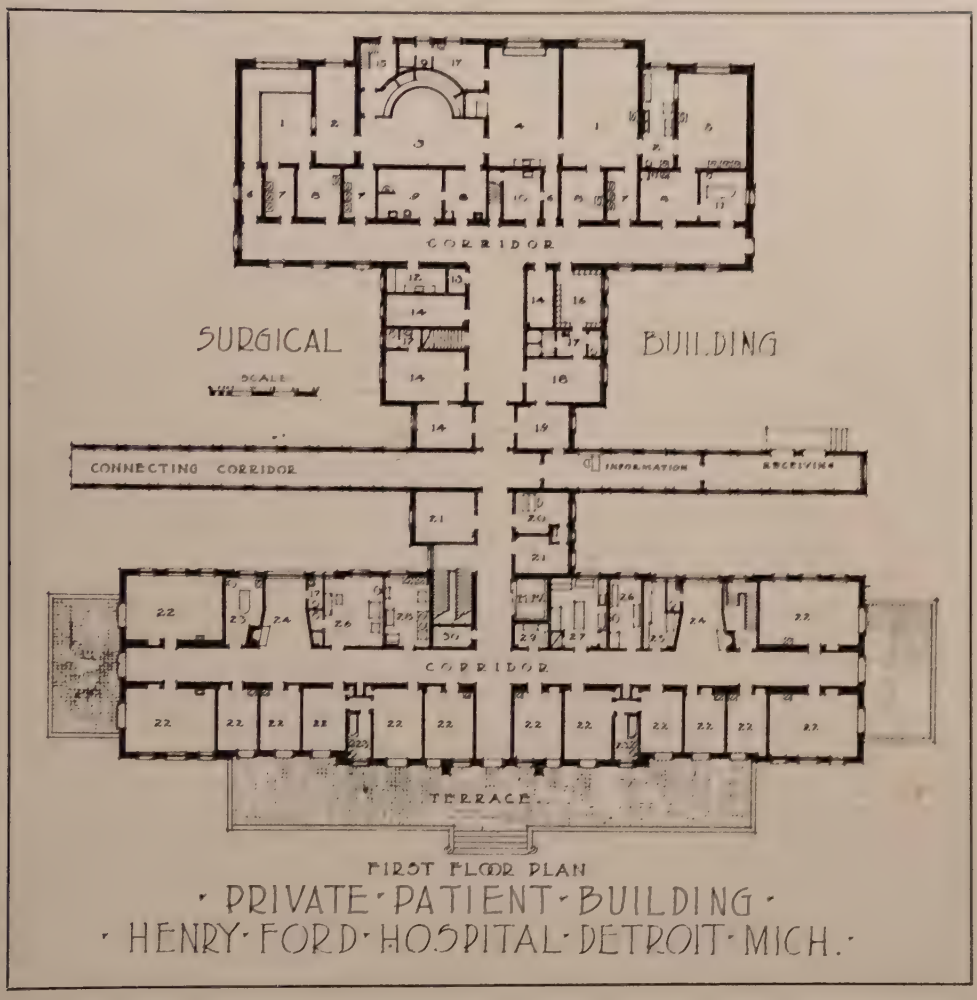



FIG. 54

1. Operating Room.
2. Sterilizing Room.
3. Operating Amphitheater.
4. Nurses' Work Room.
5. Emergency Operating Room.
6. Passage.
7. Doctor's Wash Room.
8. Anesthetizing Room.
9. Dark Operating Room.
10. Utility Room.
11. Emergency Receiving Room.
12. Laboratory.
13. Doctors' Phone.
14. Doctors' Offices.
15. Rear Entrance.
16. Doctors' Locker Room.
17. Toilet Room.
18. Waiting Room.
19. Accounting Room.
20. Phone Exchange.
21. Office.
22. Private Room.
23. Bath.
24. Alcove.
25. Linen.
26. Utility.
27. Diet Kitchen.
28. Dressing Room.
29. Head Nurse.
30. Doctors' Phone.

Bells, telephones, nurses' and doctors' calls are indispensable, but can be made to function quietly. The electric light signal has largely taken the place of audible methods of calling a nurse; the telephone and other bells can be low-toned gongs; the doctor's call may be a light, a muffled bell, or a simple telegraph call scarcely audible to the patient, but quickly detected by the one called.

Signs in the corridors sometimes help, such as "Please be quiet. The sick appreciate it."

FIG. 55

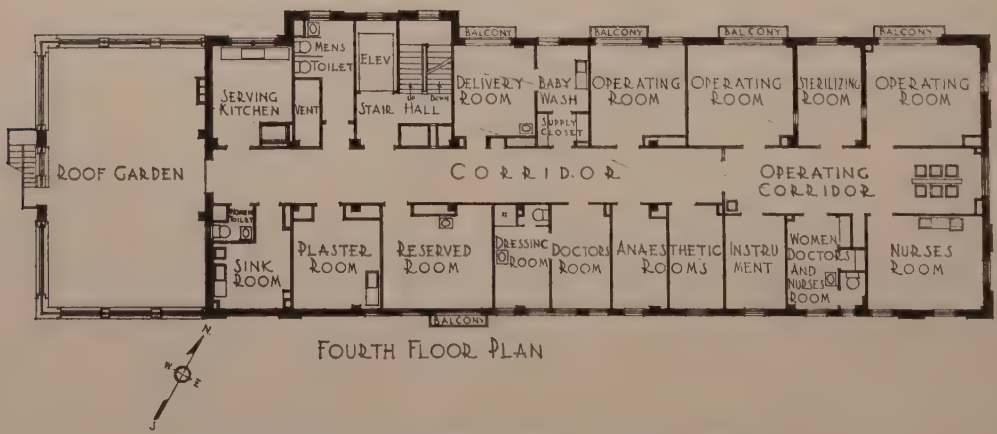



FIG. 56. PRIVATE PAVILION, HAMOT HOSPITAL, ERIE, PA.

One of the most noticeable and preventable noises is the clicking of door latches. We see them muffled with a towel or bandage or with a rubber silencer, but it is far better to omit the latch altogether and substitute a checking spring; then, with a hook handle (see Fig. 607), which may be manipulated with the wrist or arm, the door may

ADDITION TO THE HAMOT HOSPITAL
ERIE PENN
EDWARD F. STEVENS, A.I.A. BOSTON, MASS.
C. PAXTON COPP, A.I.A. ERIE, PENN.
ASSOCIATE ARCHITECTS

FIG. 57. HAMOT HOSPITAL, ERIE, PA.

be opened from either side without the use of the hand, and closed without noise.

With modern fireproof construction, hard plaster walls, elimination of architectural details, and lack of draperies, the very walls become sounding boards, which transmit or magnify noises throughout the building. Planning and sound-proofing take care of these so far as may be. The effort should be to confine the noise, so far as possible, to the locality in which it originates. Elevator and staircase noise can be avoided by enclosing them in their own shaft, away from corridors to wards or rooms. Serving rooms and sink rooms should never be next to or opposite those occupied by patients; if these utilities can be segregated, placed at the end, the center, or even around the corner from the wards, the noises will be greatly diminished. If there is a maternity department, the nursery, delivery room and labor room should be as far as possible from patients' rooms, and shut off by at least two intermediate doors. It should be remembered that in warm weather open windows readily transmit sound:

FIG. 58. PRIVATE PAVILION

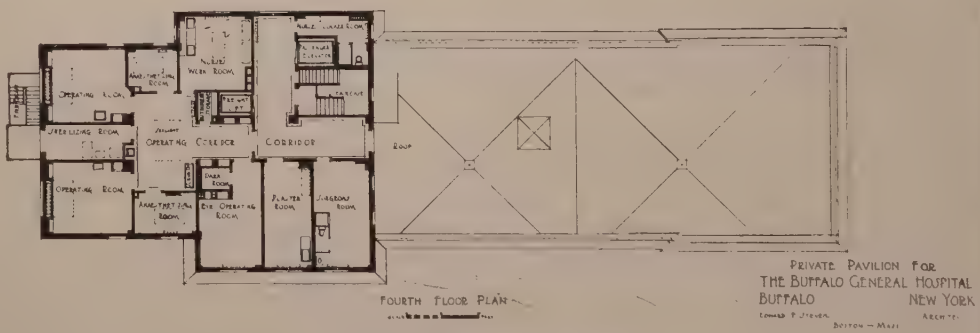



FIG. 59. PRIVATE PAVILION

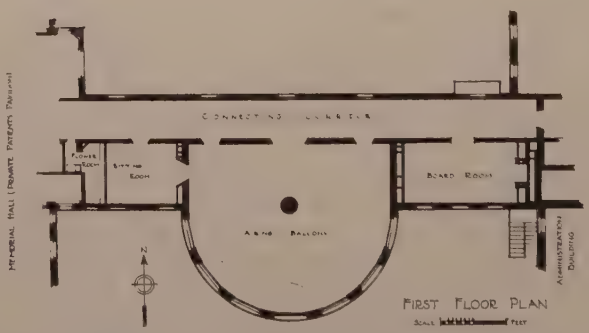



FIG. 60. CONNECTING CORRIDOR AND AIRING BALCONY BETWEEN PRIVATE PATIENTS BUILDING AND ADMINISTRATION BUILDING, BUFFALO GENERAL HOSPITAL, BUFFALO, N. Y.

FIG. 61. EXTERIOR OF PRIVATE PAVILION, BUFFALO GENERAL HOSPITAL, BUFFALO, N. Y.

hence the importance of location. Fig. 44 is an example of a maternity floor planned with special reference to sound control.

Sound transmission from room to adjoining room can be prevented by the use of deadening material, between the upright supports, though this is expensive and requires much additional space; a two-inch solid plaster wall accomplishes a marked result with an economy of space and money.

If we can neither confine nor absorb the noise when and where it is produced, we can greatly minimize it by placing on the ceilings of corridors and noisy rooms a sound-absorbing material with "intercommunicating cells"; this has a very marked effect, stopping all echoes and softening sounds. It is not noticed when used on ceilings, and may be colored to correspond with the walls.

The quality of floors is an important factor in noise. Terrazzo, vitreous tile or marble is necessarily noisy; and since in a hospital we

cannot use carpets or large rugs, we resort to cork or rubber tile, or linoleum.

Sound deadening should not be carried so far as to make the hospital "as silent as the tomb." Sound waves, like light waves, are essential to health; it is only the irritating waves which we endeavor to minimize.

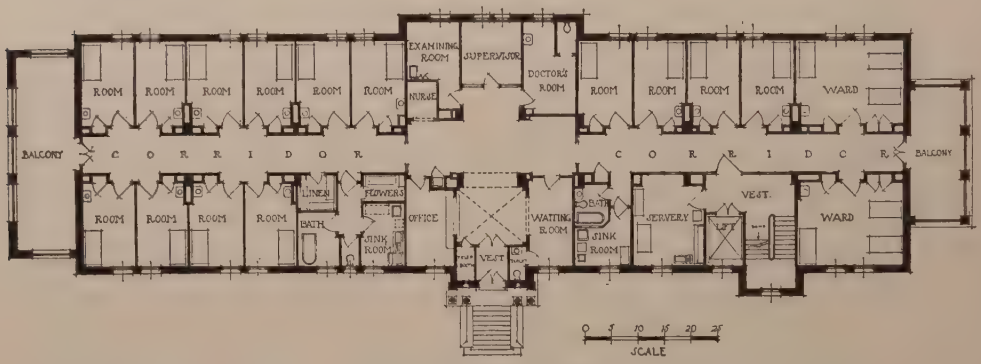



FIG. 62. FIRST FLOOR

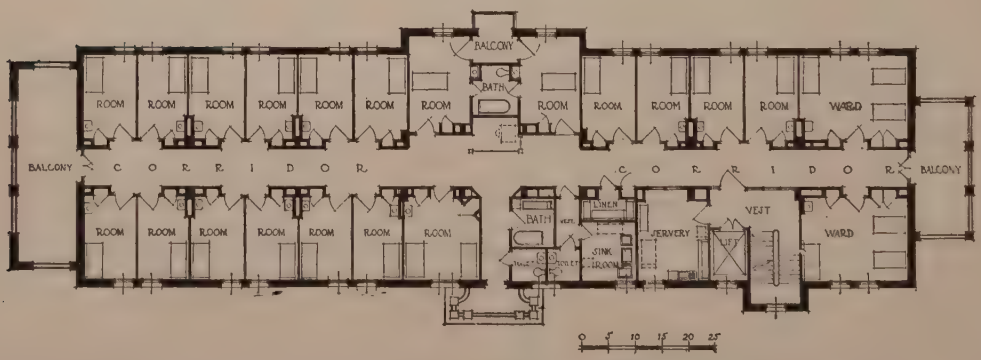



FIG. 63. SECOND FLOOR, PRIVATE PAVILION, VICTORIA GENERAL HOSPITAL, HALIFAX, N. S.

In the hospital of the future the acoustical engineer will play an important part.

## EUROPEAN WARD UNITS

In the Barmbeck Hospital, Hamburg, Germany (Fig. 6), the largest ward is sixteen beds; from each ward is a *liegehalle* or airing balcony; each ward has its *tageraum* or day room; the serving kitchen, sink rooms, and toilets are removed from the vicinity of the patients' rooms; and each ward unit has a laboratory and a surgical dressing room. This ward building proper is two stories in height, with room on the third floor for a few nurses for quick call.

FIG. 64. EXTERIOR OF VICTORIA GENERAL HOSPITAL, HALIFAX, N. S.
Stevens & Lee, Architects

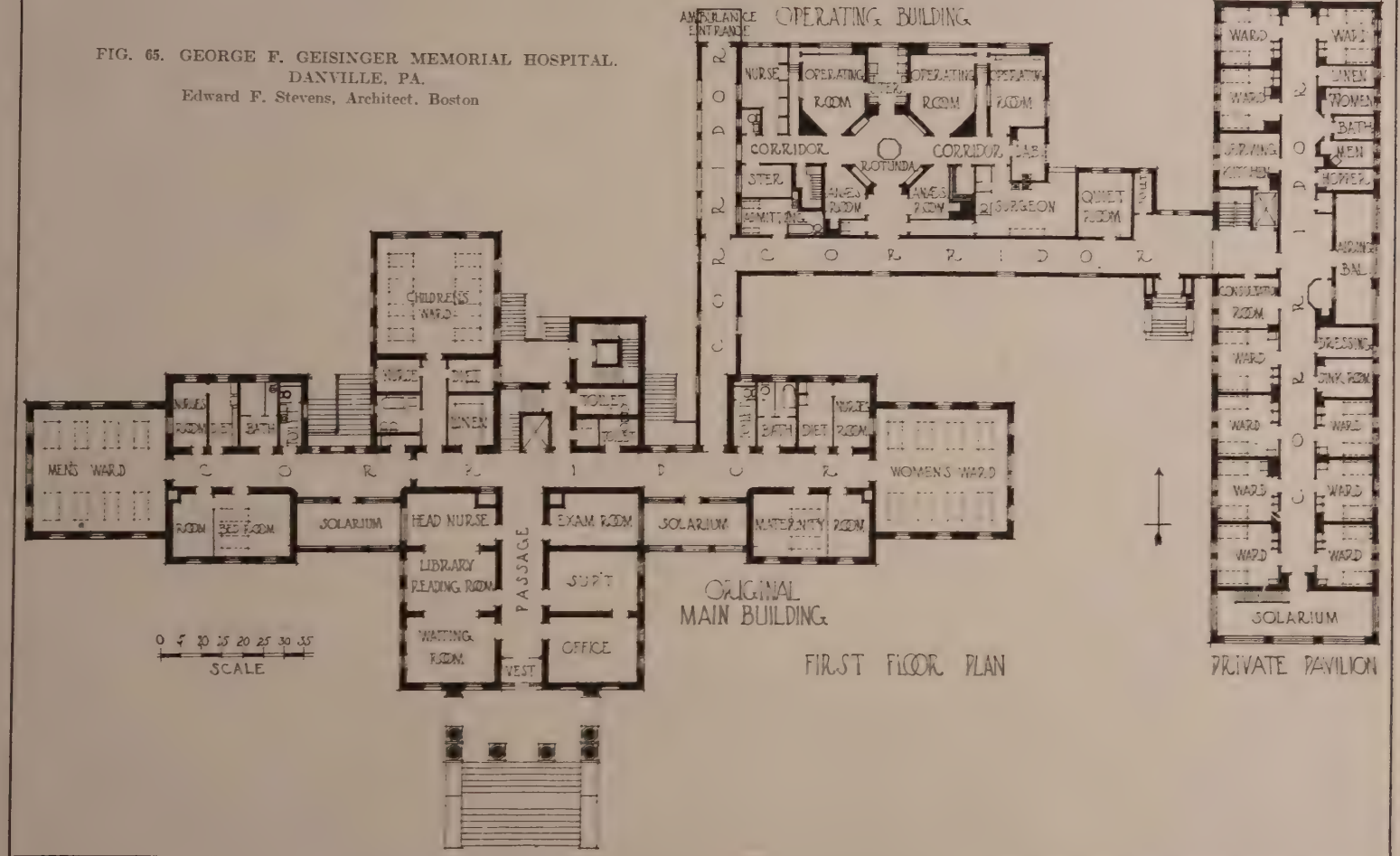
The operating building of this hospital of fifteen hundred beds has but two operating rooms, so that many of the minor surgical procedures are done in the surgical dressing rooms which are in each unit. The Barmbeck unit is an unusually good and complete one.

The Rigs Hospital, Copenhagen, Denmark, Ward Unit* (Fig. 39), has much to commend it worthy of study, for it is in many ways unique. The staircase, elevator, and other noisy equipment are kept at the extreme ends, away from the portion of the building occupied by patients. The serving kitchen, bath and sink rooms are on a cross corridor; the surgical dressing rooms and toilets are at the opposite end of the building. An isolation room and nurses' room are placed in the center.

The ward itself, containing twenty-six beds, is divided into eight sections, each section containing three or four beds. A dividing screen affords privacy to the patients and still allows free access to all parts of the room for the attendants. The screens, only six feet high and raised one foot from the floor, afford the same ventilation as an open ward. Bowls for surgeons' use and medicine closets are placed in each ward. This is doubtless one of the best developed ward units in Europe.

*When the scale is not placed on a plan, the size of the rooms can be estimated by noting the size of the beds, which are usually 3 ft. by 6 ft. 6 in.

FIG. 65. GEORGE F. GEISINGER MEMORIAL HOSPITAL. DANVILLE, PA.
Edward F. Stevens, Architect, Boston



In the Bispebjerg Hospital, Copenhagen, Denmark (Fig. 40), the ward unit is interesting, sixteen beds being the largest ward. The details of the various equipment were very carefully devised.

In the Munich-Schwabing (Fig. 43) unit the largest ward is twelve beds. All wards face the south and have opportunities for wheeling patients into the balconies and into the gardens. The balconies are spacious and comfortable with attractive boxes of flowers decorating them in summer. The service rooms are to the north, also the laboratory and dressing rooms. The day room is to the south, central with the unit.

FIG. 66. PRIVATE PAVILION, GEORGE F. GEISINGER MEMORIAL HOSPITAL, DANVILLE, PA.

The admitting department for each ward unit is very complete. The patient comes into room No. 11; his clothes are removed and put into a container of linen which is hung on a truck; he next goes to room No. 12, where he is bathed; to No. 13, where he is given hospital clothes; passes to No. 8, where final examination is made and history completed, and thence to his bed. The elevator at this part of the building is for the convenience of the second-story patients.

As an illustration of one of the more recent English hospitals, Fig. 49A shows the main portion of the Park Royal Hospital, Willesden, London. The various service buildings, maternity wards, nurses' home, infirmaries, and babies' block which adjoin the main building are not shown owing to lack of space.

In the main block are contained the administration office, kitchen, dining-rooms, and store rooms.

The ward buildings, four in number, accommodate forty-four patients on each floor, with entire service rooms, including small wards, duty rooms, etc., which connect directly by corridors to the adjoining buildings. At the end of each ward is the day room and the sanitary tower.

The receiving ward and operating unit are placed between one of the main wards and the administration block.

FIG. 67. EXTERIOR OF GEORGE F. GEISINGER MEMORIAL HOSPITAL, DANVILLE, PA.

A good example of the modern English hospital is shown in the hospital at Torquay, England (Figs. 52A, 52B, 52C, 52D). The plan of the hospital, based on the principle of large wards, surrounds an interior court and gives abundant light and air to the patients' rooms, with service rooms well located for the convenience of the nurses and attendants. The administration portion is in the one-story section between the ends of the wards and overlooks the large courtyard. The sanitary toilet towers, which are considered so necessary in most English hospitals, are flanked by the service staircases in such a way as to add to rather than detract from the architectural features of the building.

The first floor is used for semi-private and intermediate patients and for the children's and maternity wards. The entire second floor is devoted to private patients, the main kitchen and dining rooms. The out patient department is shown in Fig. 52C.

### AMERICAN WARD UNITS

The European hospitals are built and supported very largely by the governments. In this country we have a very different condition. Many of our hospitals are private corporations, and it is generally a question of accommodating the largest number of patients for the smallest amount of money. Our architects, therefore, have been often forced to economize in every way, until the wards in many cases became almost barracks for the mere housing of people, and the attendants were obliged to put up with the scantiest accommodations.

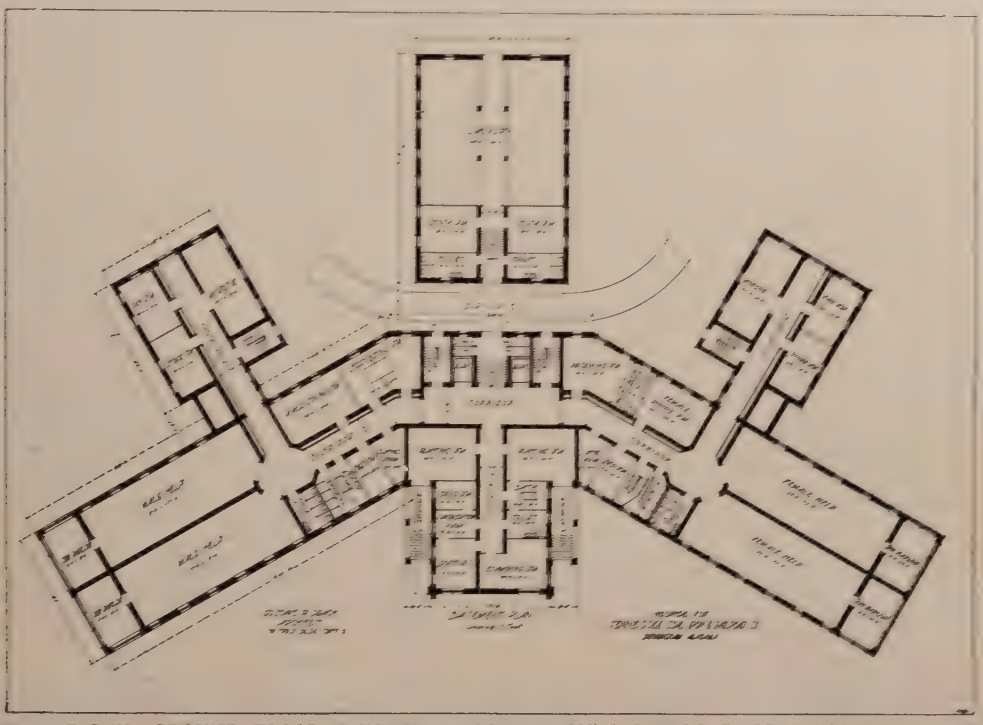


FIG. 68. GROUND FLOOR, TENNESSEE COAL, IRON & RAILROAD CO.'S HOSPITAL, BIRMINGHAM, ALA.
Gustave W. Drach, Architect

Some of our newer hospitals are rising in scale. Instead of making a number of rooms and leaving it to the administrator to find out later what he can put into these rooms, they are allowing their architects to provide some of the more essential rooms, such as the sink room, a serving kitchen of sufficient size, a surgical dressing room, laboratory, etc.; and are letting him design and plan the equipment at the time he makes the drawings for the building.

The care and thought put by Dr. H. B. Howard, upon the working out of the plan of the PETER BENT BRIGHAM HOSPITAL, Boston (Figs. 46-48), make it worthy of attention.

The first floor of the ward unit contains two large wards, one of eight and the other of fourteen beds. A cross corridor separates the two wards. Two isolation rooms, with diet kitchen, duty room, baths and toilets, are grouped together on the side of the corridor opposite the main ward. There are, also, a laboratory and a consultation room on this floor.

The staircase and elevator lead directly from the main corridor at the extreme north end of the building.

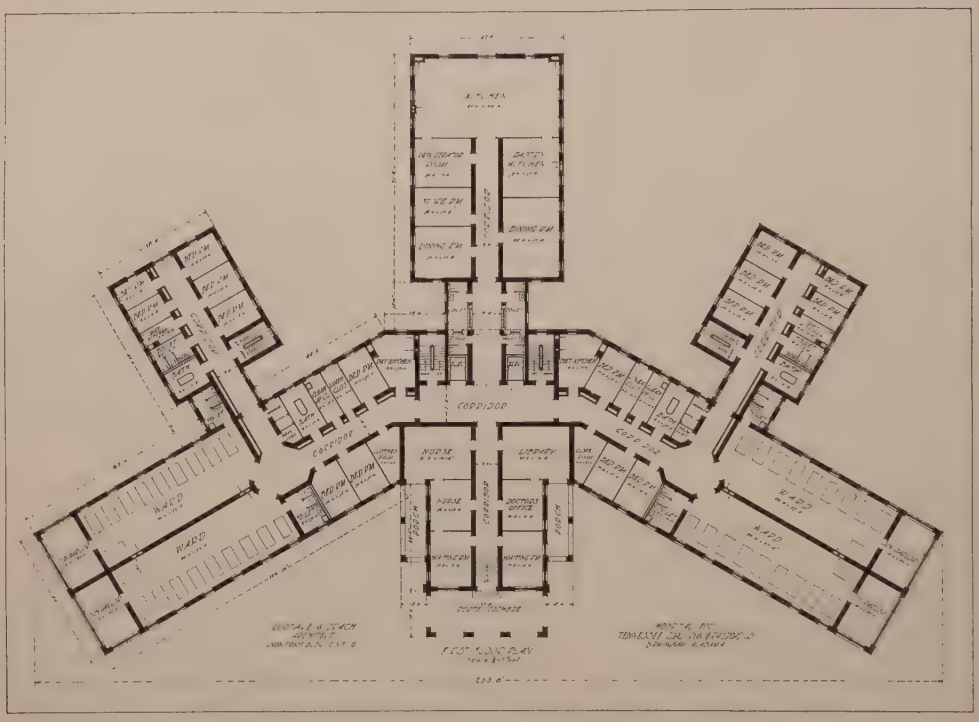



FIG. 68A. FIRST FLOOR, TENNESSEE COAL, IRON & RAILROAD CO.'S HOSPITAL, BIRMINGHAM, ALA.

Gustave W. Drach, Architect

In the second story there is one large ward of twelve beds, two isolation rooms, duty and toilet rooms. Ample airing balconies or terraces on both floors provide outdoor space for all the patients of this unit.

The portion of the building containing the octagonal ward (Fig. 47) is but one story in height, and has monitor windows. The main ward, second story (Fig. 48), is also top-lighted.

On the third floor (Fig. 46) there is an open-air ward, with the necessary duty room, toilet, and isolation rooms. This can also be used for contagious cases which may develop in the hospital.

The CINCINNATI GENERAL HOSPITAL shows the influence of European examples. The late Dr. Holmes gave much thought to the perfecting of this ward unit (Figs. 50-52).

In this ward unit the nurses' station, while not directly in the main ward, is in such a position that it commands a view of all the ward beds, as well as the doors of the private rooms.

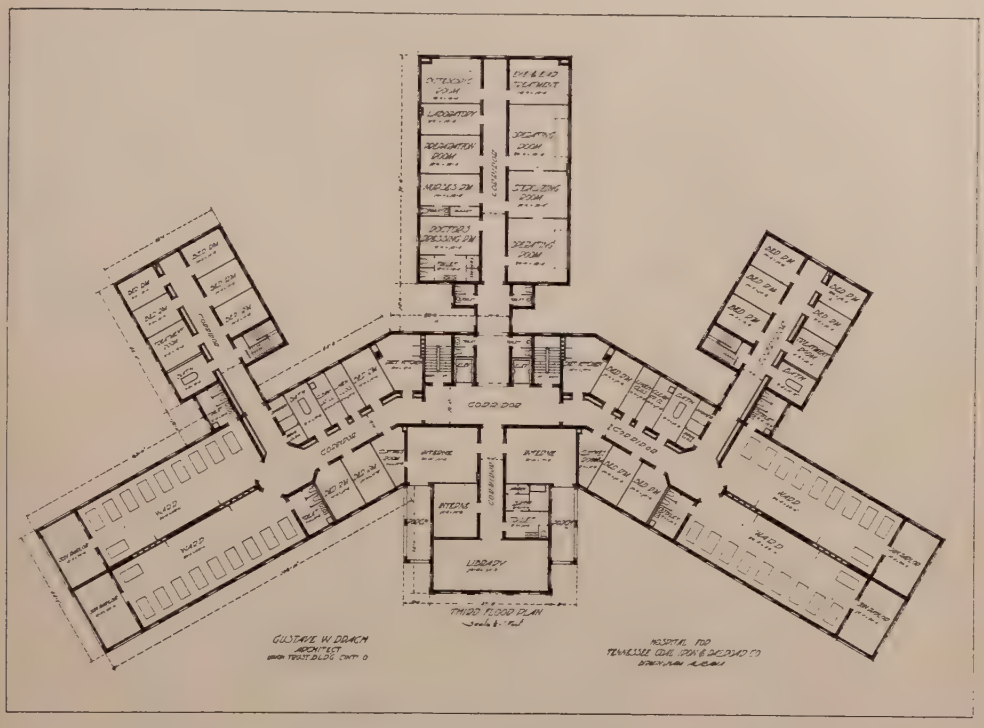



FIG. 68B. THIRD FLOOR, TENNESSEE COAL, IRON & RAILROAD CO.'S HOSPITAL, BIRMINGHAM, ALA.

Gustave W. Drach, Architect

The patients' toilet is entered through a fresh-air cut-off, after the manner of the best-planned English hospitals. The sink room is entered either through the nurses' work room or directly from the corridor. There are additional toilet facilities connected with the solarium, thus minimizing the work of nurses or attendants.

The utilities, baths, and toilets are grouped together. The entrance to the serving kitchen is near the main stair and elevator corridor. A commodious dining room is provided for those patients who are able to be about.

In the Henry Ford Hospital, Detroit, Michigan (Fig. 54), the ward unit provides for sixteen beds in the general ward, one two-bed ward and two single rooms. The patients' toilet is entered indirectly from the ward through a fresh air passage. There are also additional toilets, entered from the solarium or day room. The arrangement of the private ward unit and the operating building are shown in Fig. 54.

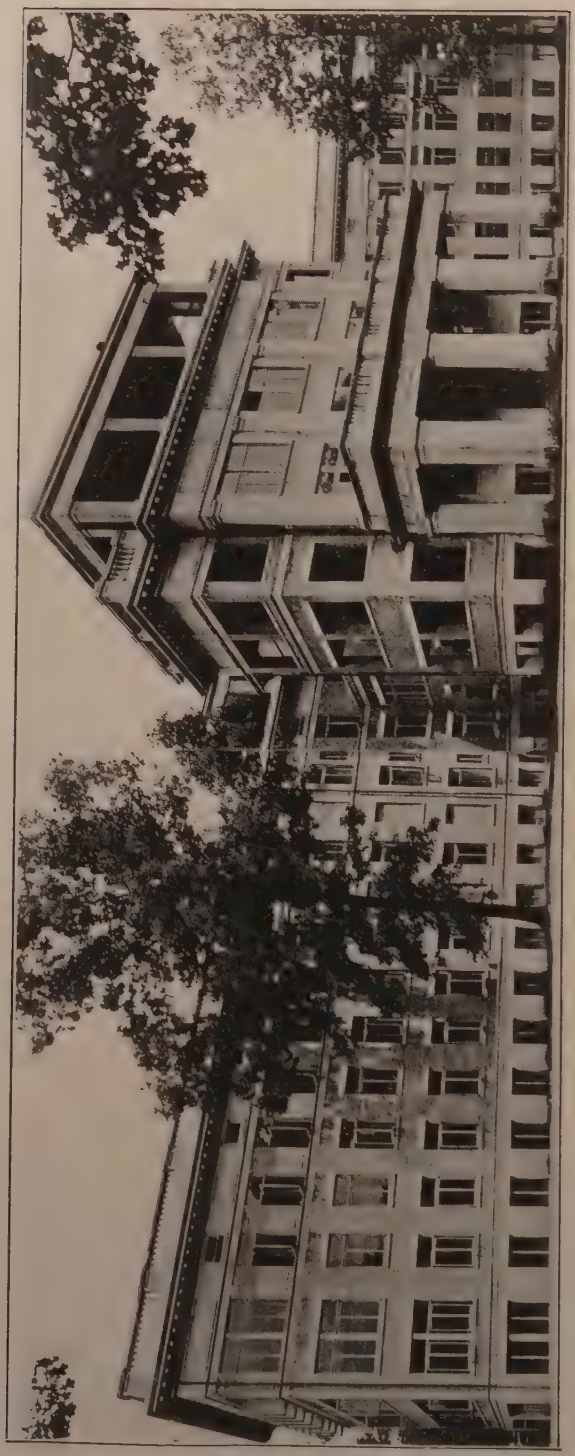


FIG. 69. EXTERIOR, TENNESSEE COAL, IRON & RAILROAD CO.'S HOSPITAL, BIRMINGHAM, ALA.
Gustave W. Drach, Architect

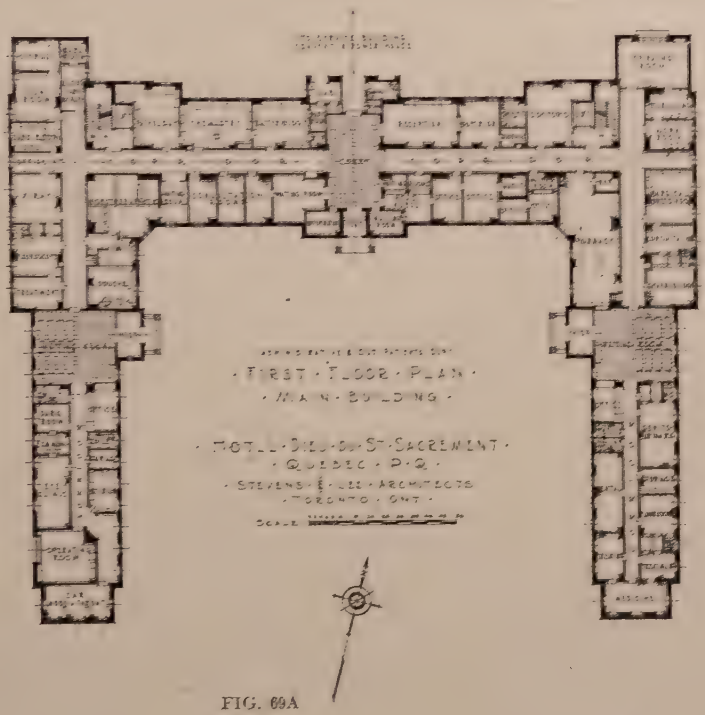



FIG. 69A

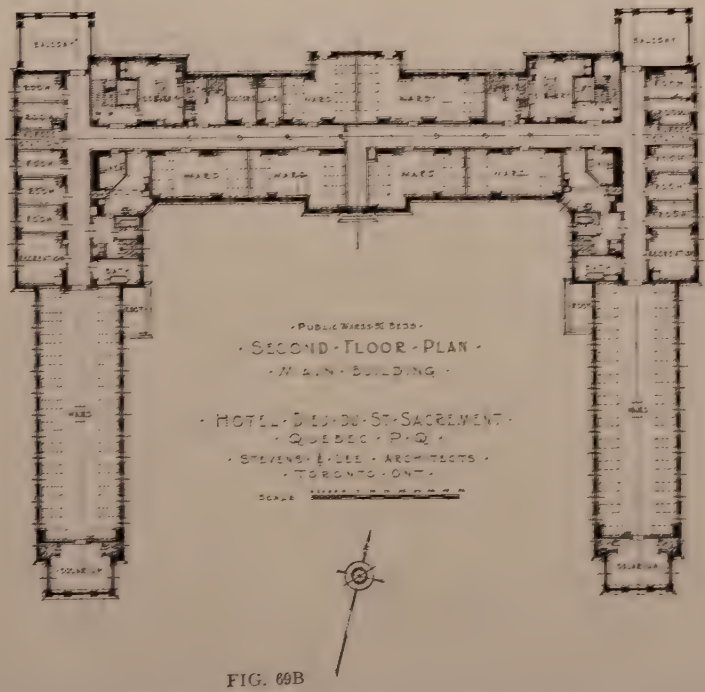



FIG. 69B

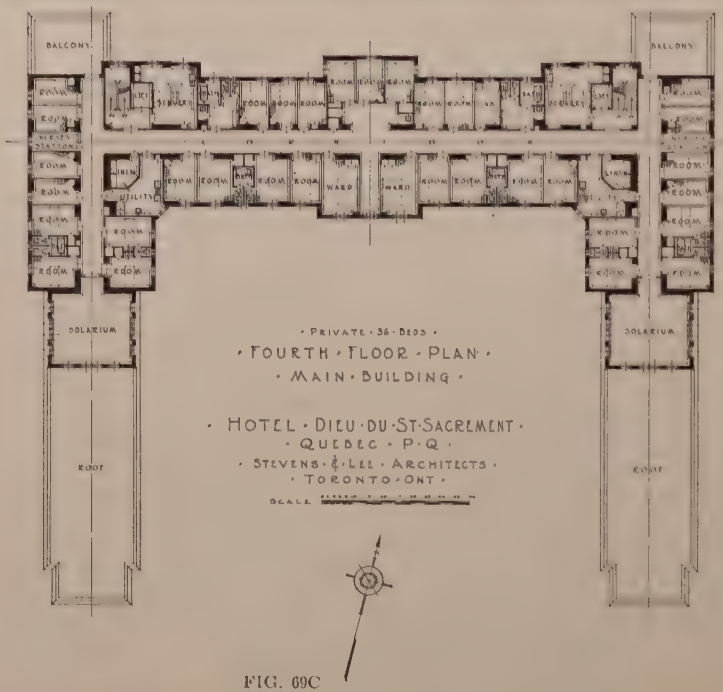



FIG. 69C

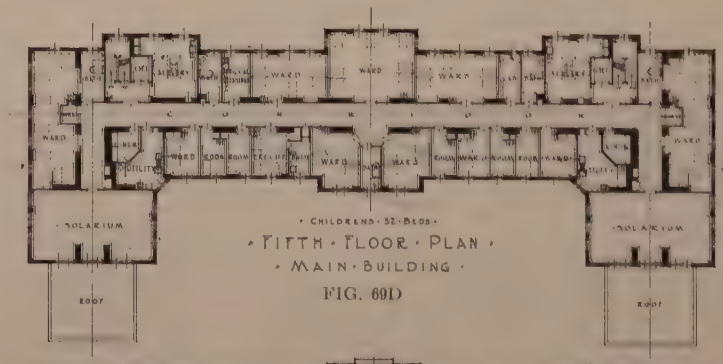



FIG. 69D

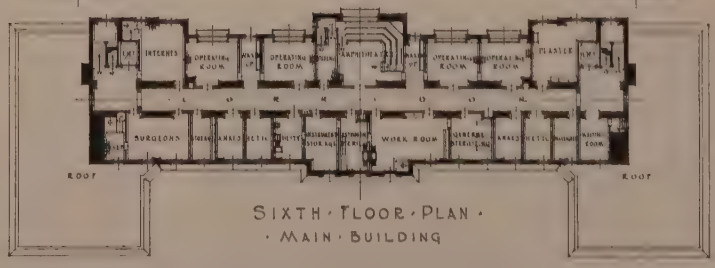



FIG. 69E

Courtesy of The Architectural Forum

FIG. 70. EXTERIOR, PRIVATE PAVILION, MT. SINAI HOSPITAL, NEW YORK, N. Y.
Arnold W. Brunner, Architect; S. S. Goldwater, M.D., Consultant

The addition to the Hamot Hospital, at Erie, Pennsylvania, consists of a seven-story fireproof building (Fig. 57), which is devoted largely to private rooms and surgical department of the hospital. This pavilion was designed as the first unit of an entirely new Hamot Hospital, but is complete in itself. In this ward unit all the utilities are grouped at one end of the building; the stair hall and elevator are shut off from the main corridor; the sink room and serving kitchen are at the extreme end of the building. A large solarium and airing balcony are on the southwest end of the building on each floor. Fig. 55 shows a typical floor.

OPERATING ROOM FLOOR PLAN

FIG. 71. PRIVATE PAVILION, MT. SINAI HOSPITAL, NEW YORK, N. Y.

The private ward unit of the Buffalo General Hospital, Buffalo, New York (Figs. 58, 59, 61), provides for suites with baths, and comfortable single rooms with a lavatory in each. The sink room and the serving kitchen open from cross corridors to avoid noise. A special room, with sink, is provided for flowers.

In the addition to the Victoria General Hospital, Halifax, Nova Scotia (Figs. 62, 63), the problem was to connect the new ward building with the existing service building. It could not be done through basement nor wards, but was accomplished by making a corridor through the attic of the old building and connecting it by a bridge to the third floor of the new. The lift takes food direct to the servery on each floor.

The first floor has a small office, a waiting room for visitors, a doctors' room, an examining room, and an office for the supervisor. There are two three-bed wards and fourteen private rooms, each having its own laboratory. There are two sink rooms, a flower room,

ample balconies and all needed utilities. The second floor has two rooms with connecting bath and private balcony. Special features are the projecting nurses' station which gives a view of the whole floor, and the placing of the utility rooms on side corridors to obviate noise.

In the private patients' pavilion of the George F. Geisinger Memorial Hospital, Danville, Pennsylvania (Figs. 65, 66, 67), the first floor has ten double rooms or two-bed wards, each with two

TYPICAL FLOOR PLAN

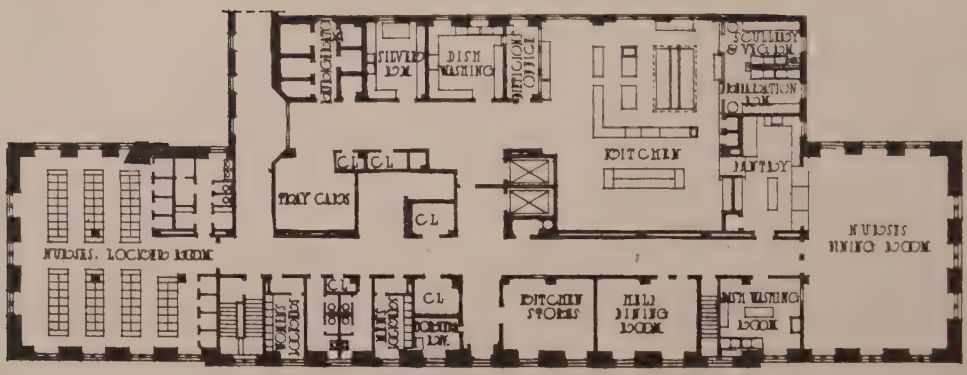
FIG. 72

FIRST FLOOR PLAN

FIG. 73

PLANS, PRIVATE PAVILION, MT. SINAI HOSPITAL, NEW YORK, N. Y.

closets for clothing and its own lavatory. There is a large solarium, a large open balcony, a consultation room, a surgical dressing room, and two sink rooms, with other utilities centrally located. The second and third floors each have four sets of rooms with a communicating bath between, a surgical dressing room (used chiefly for preparation, storage, scrub-up, etc.), a flower room, an extra hopper room, with balconies and utilities as on the first floor.

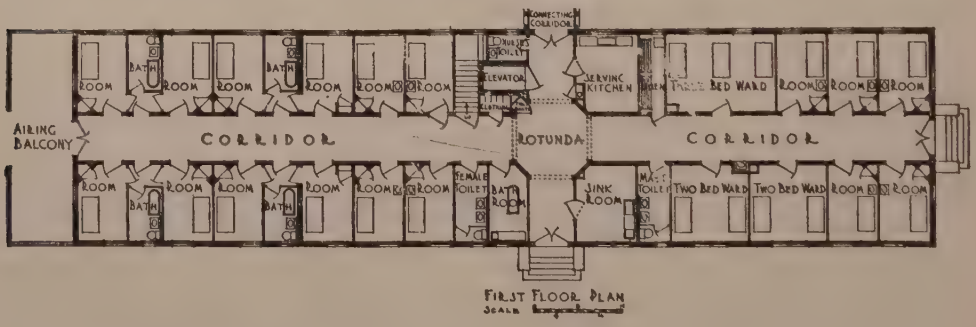



**BASEMENT FLOOR PLAN**

FIG. 74. PRIVATE PAVILION, MT. SINAI HOSPITAL, NEW YORK, N. Y.

That "All healing is Divine healing" is perhaps no more vividly expressed than in some of our church hospitals where the ministering attendants are Sisters of the various church orders. Here religion and healing go hand in hand, and the soul as well as the body is ministered to.

Such a hospital is the HOTEL DIEU DU ST. SACREMENT at Quebec (Figs. 69A-69E). As this hospital is administered by a cloistered



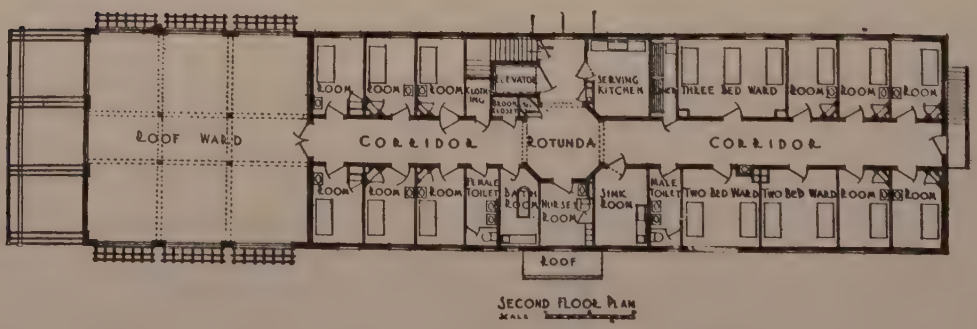




FIG. 75. PRIVATE PAVILION, ST. LUKE'S HOSPITAL, JACKSONVILLE, FLA.
Edward F. Stevens, Architect; Mellen C. Greeley, Associate

FIG. 76. PRIVATE PAVILION, ST. LUKE'S HOSPITAL, JACKSONVILLE, FLA.
Edward F. Stevens, Architect; Mellen C. Greeley, Associate

order of nuns, the administration portion is planned to meet the demands of the order, with cloistered consultation and business offices. The patients' portion is similar to that of any well-planned hospital. The open wards are perhaps larger than many modern wards, but are built especially to meet the requirements of this hospital.

Special attention is called to the out-patient department, where an unusually large head clinic is provided. The X-ray department also is considered very complete.

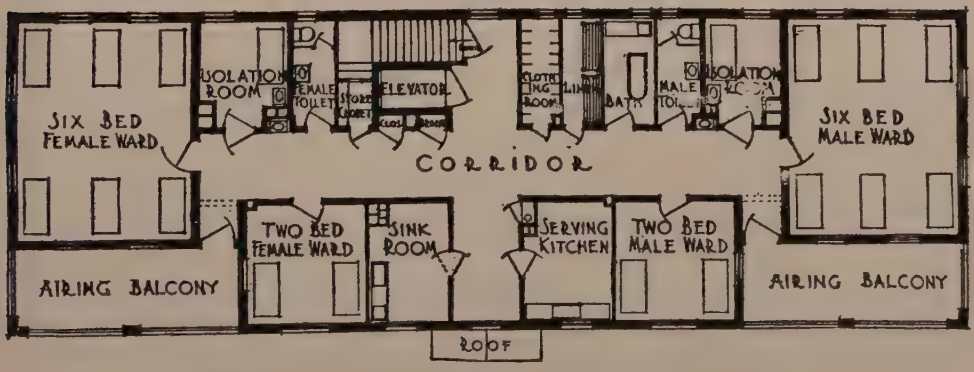



FIG. 77. PUBLIC WARD UNIT, ST. LUKE'S HOSPITAL, JACKSONVILLE, FLA.

FIG. 78. CORRIDOR AND WARD, ST LUKE'S HOSPITAL, JACKSONVILLE, FLA.

The various departments—the children's, the surgical, and the medical—are taken care of, and provision is made for private, intermediate and public patients, with utilities. Out-of-door balconies are provided.

The service building contains the kitchen, dining-rooms and lecture theatre, and adjoins the hospital building.

The Convent or Sisters' home and community house, as well as the chapel, adjoin the service building, while the power house and laundry are near by (Fig 19A).

The private patients' pavilion of Mt. Sinai Hospital, New York City (Figs. 70-74), is a block plan, designed for the corner of a restricted city site. It is extremely well planned and workable. The first floor and the operating floor are noteworthy as examples of administrative and operating units on the same floor with sick patients yet well separated, so that no annoyance is possible.

The hospital for the Tennessee Coal, Iron and Railroad Company at Birmingham, Alabama (Figs. 68-69), is planned so as to secure the maximum amount of light and air. The small wings make it possible to easily isolate any special cases, such as venereal. There are both wards and private rooms with ample utilities. The operating rooms are in the central building on the third floor.

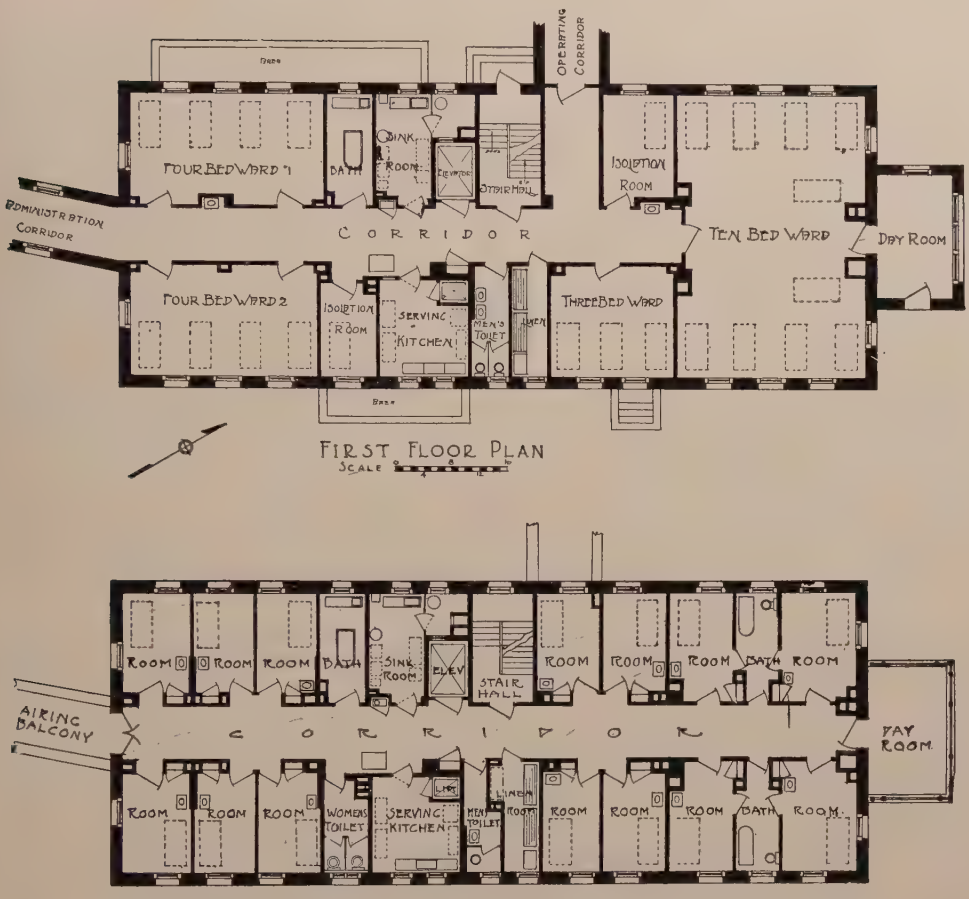
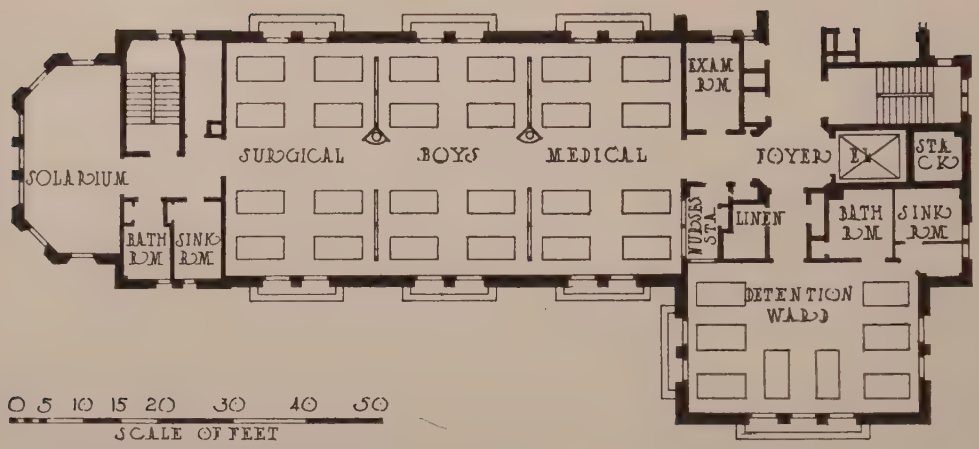



FIG. 79. TOD WING, YOUNGSTOWN HOSPITAL, YOUNGSTOWN, OHIO

In the ST. LUKE'S HOSPITAL, Jacksonville, Florida, it was planned to have several public ward units (Fig. 77), accommodating thirty-six patients in each building, the largest ward containing but six beds. The entrance is from the open-air corridor at the east, and the utility rooms are grouped around this entrance, with the doors to sink room, serving kitchen, nurses' toilet, and elevator opening from the cross corridor, minimizing the noises from these disturbing elements. Two large airing balconies are provided on each floor.

In the private pavilion of the same hospital (Fig. 75) a similar arrangement is secured so far as the utilities are concerned. The units are smaller, a three-bed ward being the largest, most of the space being utilized for single rooms. In this plan, the open-air ward is introduced on the second floor, being connected with the main corridor




Courtesy of The Architectural Forum

FIG. 80. WARD, CUMBERLAND STREET HOSPITAL, BROOKLYN, N. Y.
Ludlow & Peabody, Architects

and served from the main utility rooms. Both this building and the public ward unit are but two stories in height.

In the YOUNGSTOWN HOSPITAL at Youngstown, Ohio, the ward unit (Fig. 79) is not unlike some of the others described, providing for a central location of the utilities, with sufficient isolation for the rooms and wards to minimize the effect of noises upon the patients.

The first floor of this pavilion is used only for ward patients; and the second, third, and fourth floors for private patients. On the north there is a day room on each floor, and a large roof ward on the fifth floor.

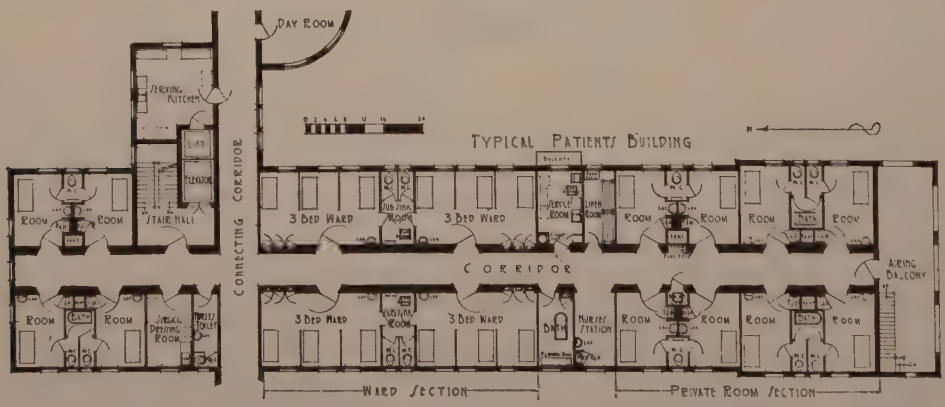



**Fig. 5. Pavilion of Small Wards and Private Rooms, Biltmore Hospital, Biltmore, N. C.**
Stevens & Lee, Architects

Courtesy of The Architectural Forum

FIG. 81. TYPICAL FLOOR PLAN, BILTMORE HOSPITAL, BILTMORE, N. C.
Wm. H. Lord, Architect; Stevens & Lee, Associated Architects

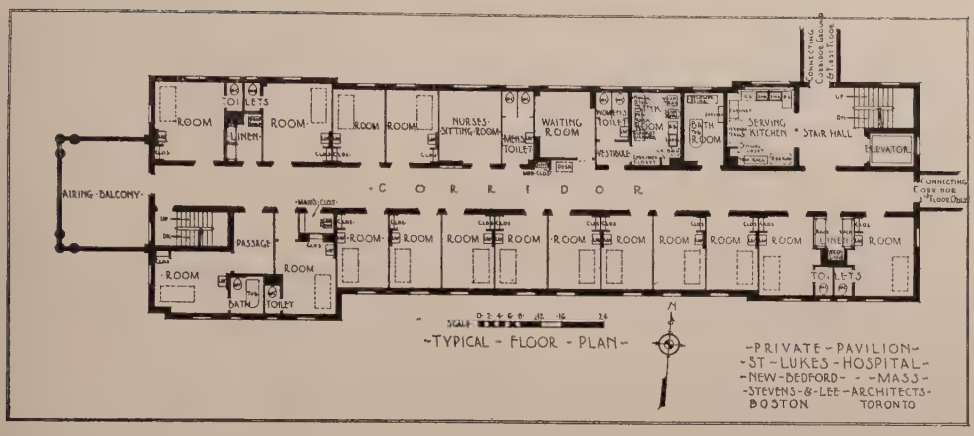
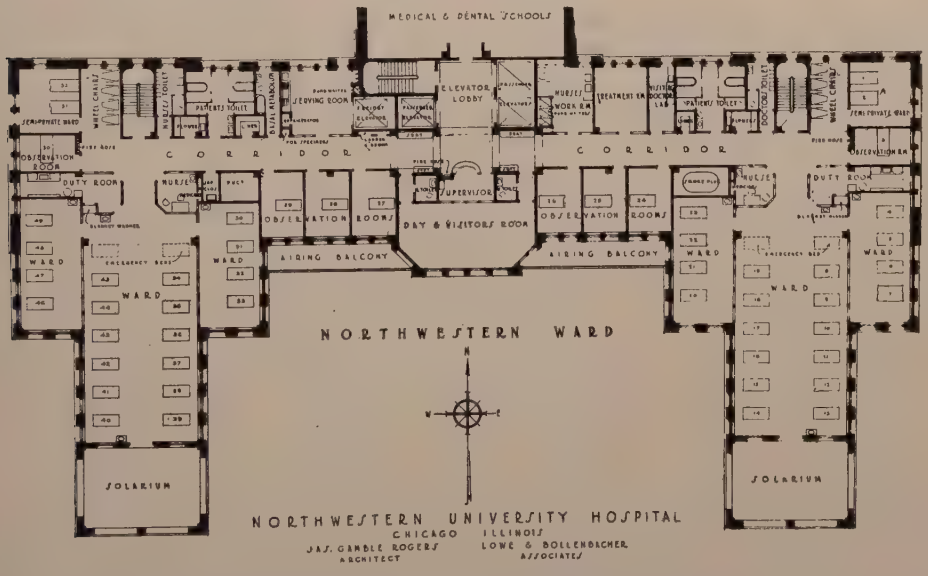



FIG. 82. PRIVATE PAVILION, ST. LUKE'S HOSPITAL, NEW BEDFORD, MASS.

In the CUMBERLAND STREET HOSPITAL, Brooklyn, New York (Fig. 80), is used the so-called "alcove" ward, the advantages of which are: (a) it gives semi-privacy; (b) accommodates a greater number of patients in the same space; (c) avoids having patients face the light from the opposite side of the ward.

The BILTMORE HOSPITAL, Biltmore, North Carolina (Fig. 81), presents examples of private rooms with baths, private rooms with "utility" toilets, and three-bed wards with "sub" sink rooms, time and labor saving planning.




Courtesy of *The Modern Hospital*

FIG. 83. WARD, NORTHWESTERN UNIVERSITY HOSPITAL, CHICAGO, ILL.
James Gamble Rogers, Architect; Lowe & Bollenbacher, Associates

The private patients' pavilion of St. Luke's Hospital, New Bedford, Massachusetts (Fig. 82), has three floors of single rooms. A few have a private bath and a number have a "utility" toilet. There is on each floor a waiting room, an airing balcony, and a room for special nurses. The serving kitchen, sink room, stairs and elevator are cut off from the main hall. The nurses' station is in the center.

In the Northwestern University Hospital, Chicago, Illinois (Fig. 83), the center of the ward unit is occupied by the elevator lobby, the supervisor's station and a large day room. There is really a double unit, each part having a fourteen-bed ward, with a unique arrangement of side wards holding four beds each, and a nurses' station in full view of the whole. There are also single rooms and double rooms, a central serving kitchen, treatment rooms, nurses' work room, etc. The plan has some excellent features.

# CHAPTER IV

## GENERAL HOSPITALS

IN the writing of this book, the author has tried to group the various types of hospitals under different headings, but there are a number which are not special and which perhaps function in various ways; so the author thought that a chapter on general hospitals might take care of the vast group which have not been mentioned under any special subdivision. A general hospital may have ten beds or it may have a thousand beds and still be a general hospital, and many of the institutions shown in other chapters in this volume might with propriety be put in this chapter on general hospitals. However, there are a few shown in this section simply because they do not belong distinctively to any particular group.

In the OTTAWA CIVIC HOSPITAL, Ottawa, Canada (Figs. 84-92), the H-shaped building is designed to be administered as two units, right and left. On the so-called tunnel floor there is much space allowed for storage, thus permitting supplies to be bought in quantity when market conditions are favorable.

The ground floor contains a very complete out-patient department (see Chapter XIII); large locker rooms where all ward patients' clothing can be properly hung and systematically taken care of; the admitting department, already described; the Roentgen-ray, psychopathic, isolation and medical treatment departments.

In the center of the first floor is the administration, the remainder being devoted to wards. The second floor is reserved for women ward patients, 130 in all, in wards of three, five and six beds, or four-bed units in sixteen-bed wards. The five utility rooms save much time and travel for the nurses and facilitate service. Three nurses' stations command the whole area. There are two large serving kitchens, two surgical dressing rooms, and a special isolation department for venereal cases.

The third floor is the maternity department, wards and private rooms, with two delivery rooms, labor room and accessories, two nurseries, and an isolation department for infected cases.

The fourth floor consists of wards for semi-private cases. The fifth, comprising seventy private rooms, has twelve provided with baths, making especially flexible units. There are very large balconies, and all doors throughout the hospital will admit of beds being moved

in and out. On each floor there is space reserved for wheel chairs and stretchers.

The sixth floor contains the operating department, and roof wards with all requisite utilities, located near the elevator.

In the Notre Dame Hospital, Montreal (Figs. 93-95A), the irregular H-shape of the building is due to the size and shape of the plot of ground. The considerable slope was made a reason for locating the entrances for ambulance cases and out-patients at the rear of the main part of the building. There is one admitting department for both in and out patients, located here.

On the ground floor the right wing is devoted to the out-patient department; the center to the laboratories—pathological, chemical and bacteriological, and the autopsy; the left wing contains the medical treatment department, the occupational therapy room, and two isolation departments, each self-contained.

The first floor (Fig. 93A) is given up to wards, except the center administration portion. The second and the third floors each contain three units of wards, the sixteen-bed wards being divided into four sections (the Rigs design). There are many three and four bed wards, and a number of single rooms for seriously ill or disturbing cases. There are two large serving kitchens, three nurses' stations, a surgical dressing room, and ample, easily accessible balconies. The fourth and fifth floors, of sixty-five private rooms each, have similar utilities.

The sixth floor contains the Roentgen-ray department, at the left, the remainder being the surgery, with four operating rooms, a plaster room, etc.

All floors are planned so that the left wing can be built after the remainder of the hospital is in use.

The Galloway Memorial Hospital at Nashville, Tennessee (Fig. 96), consists of a group of three buildings, the first one to be erected being in the center, and is composed of an operating pavilion, charity ward pavilion, and private ward pavilion.

In the operating pavilion the basement floor is to be used for administrative purposes and to the rear an ambulance porch shelters patients being received. The second floor consists of the operating department, together with dressing rooms, sterilizing, anaesthetic and recovery rooms, and all other modern arrangements necessary to a thoroughly equipped operating department. The third floor is similarly fitted for a charity operating department, and is furnished in every particular with the same conveniences and advantages that the pay service will afford.

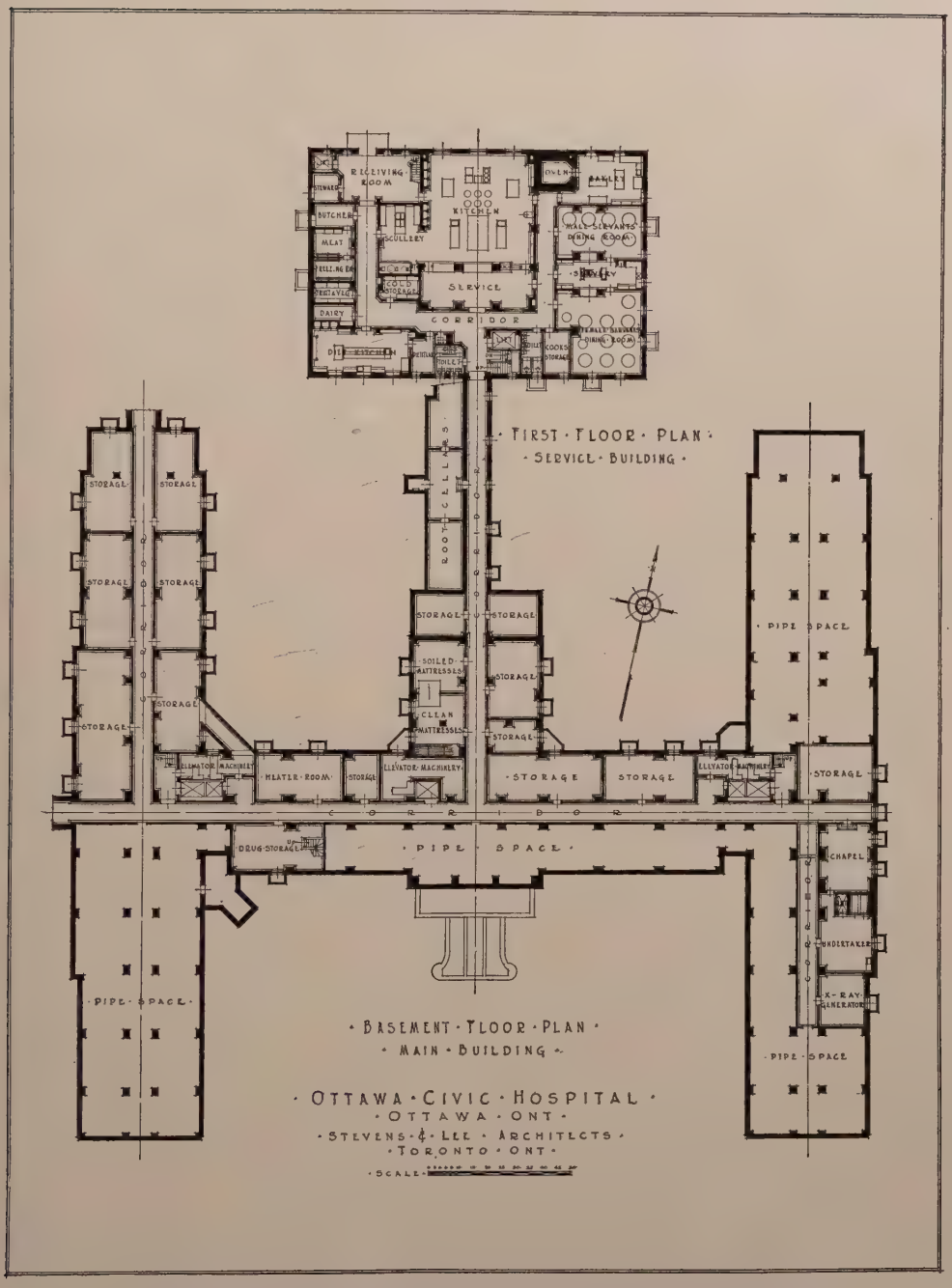



FIG. 84. BASEMENT FLOOR, OTTAWA CIVIC HOSPITAL, OTTAWA, CAN.

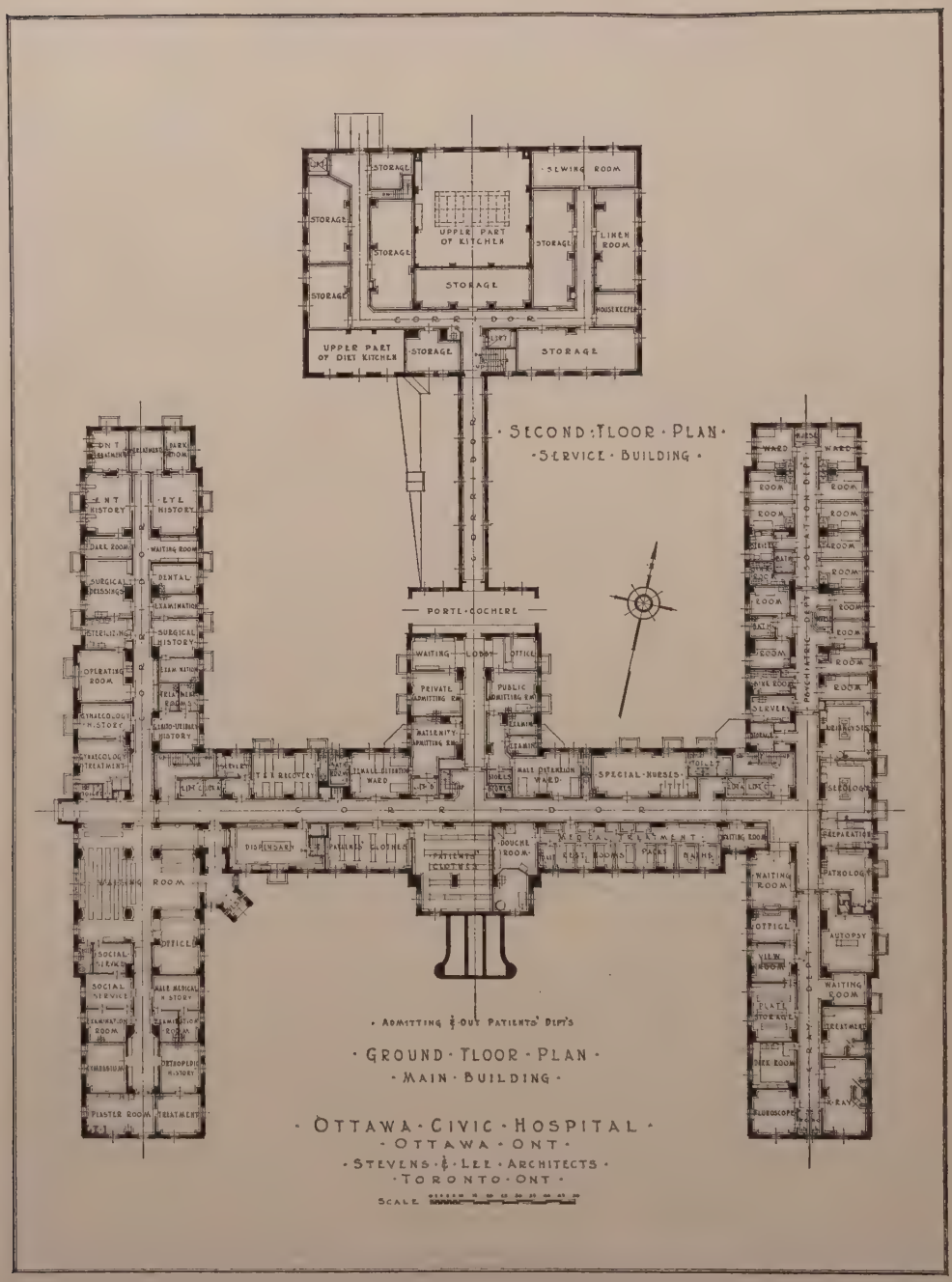



FIG. 85. GROUND FLOOR, OTTAWA CIVIC HOSPITAL, OTTAWA, CAN.

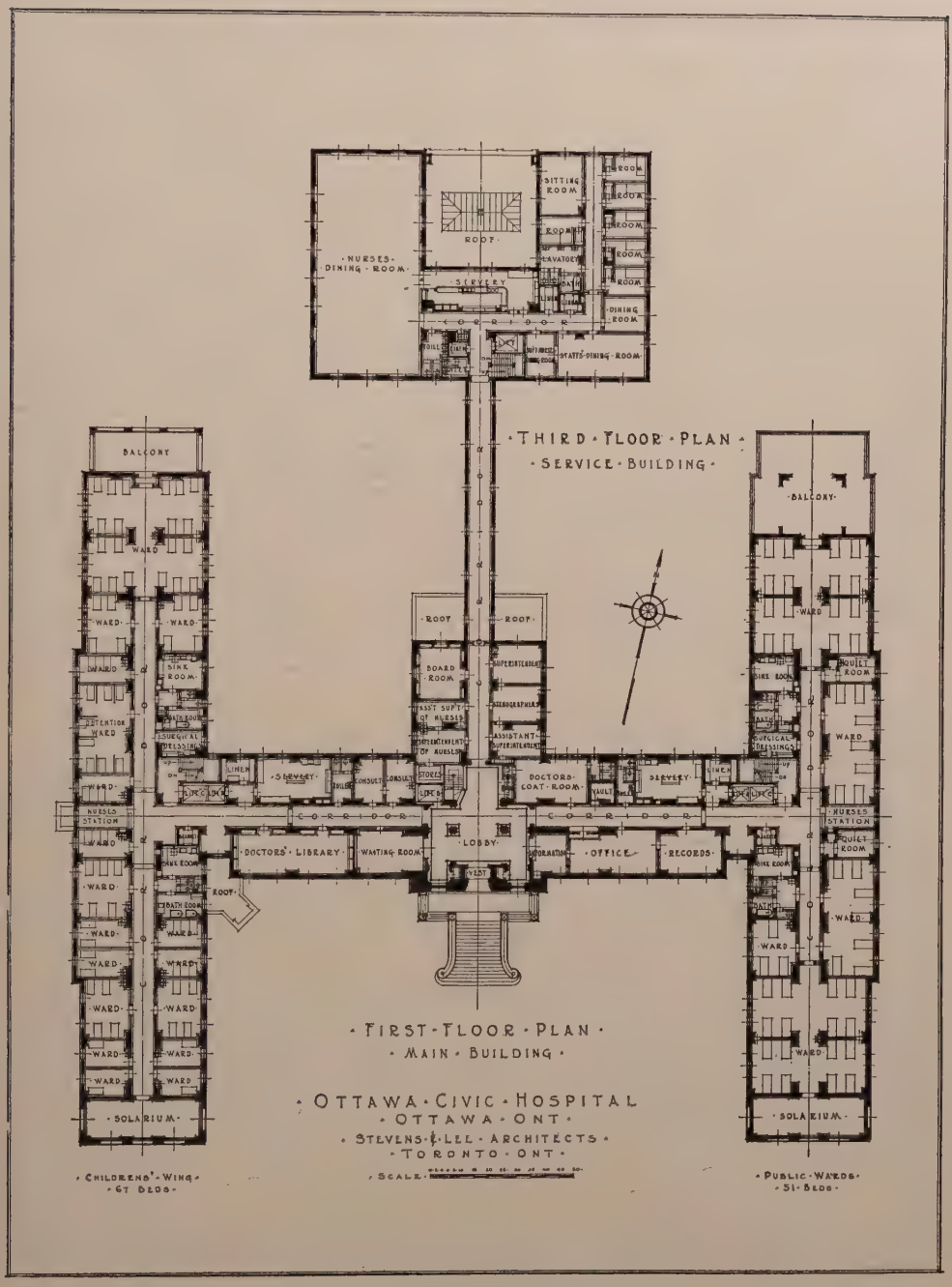



FIG. 86. FIRST FLOOR, OTTAWA CIVIC HOSPITAL, OTTAWA, CAN.

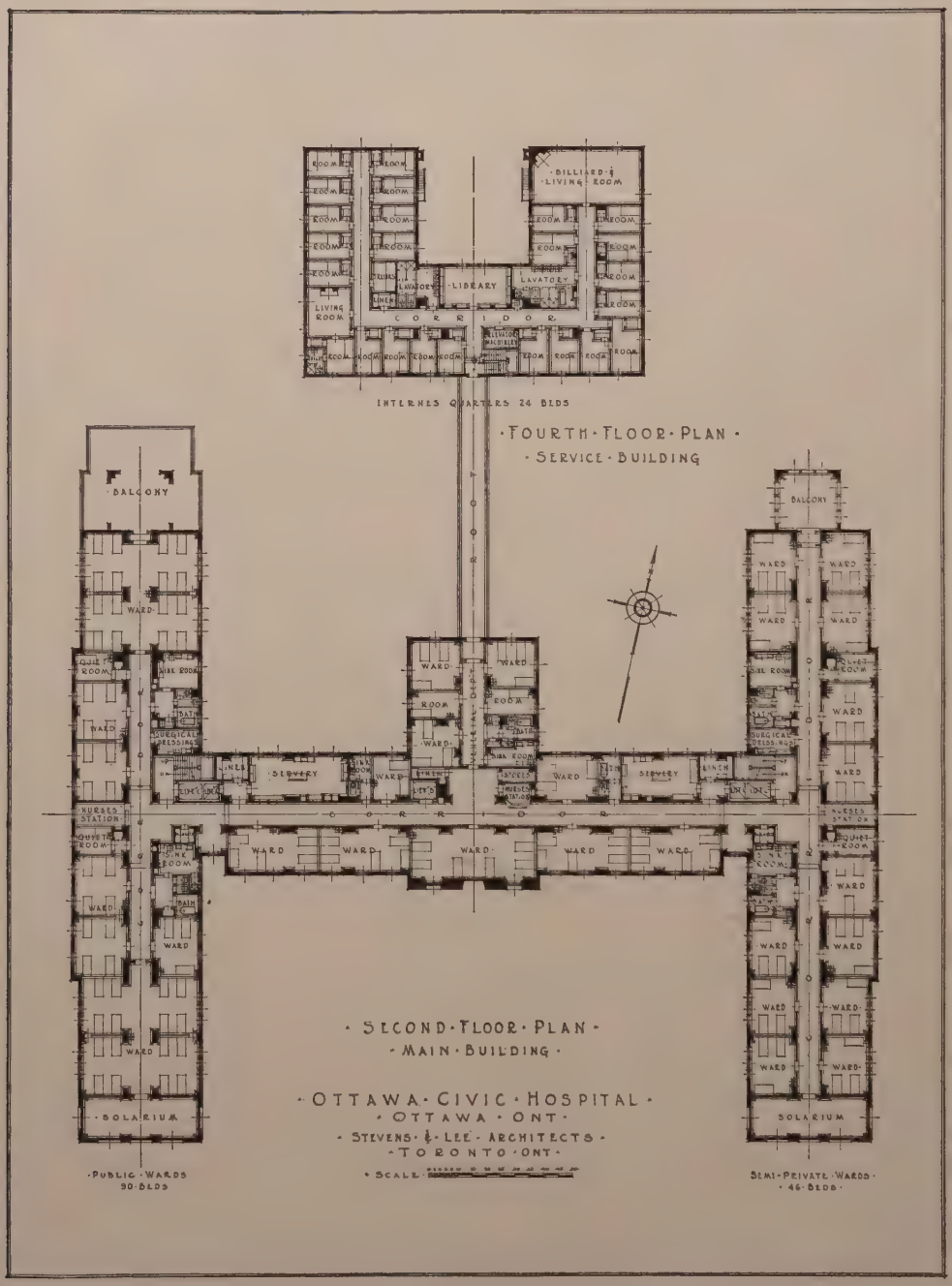



FIG. 87. SECOND FLOOR, OTTAWA CIVIC HOSPITAL, OTTAWA, CAN.

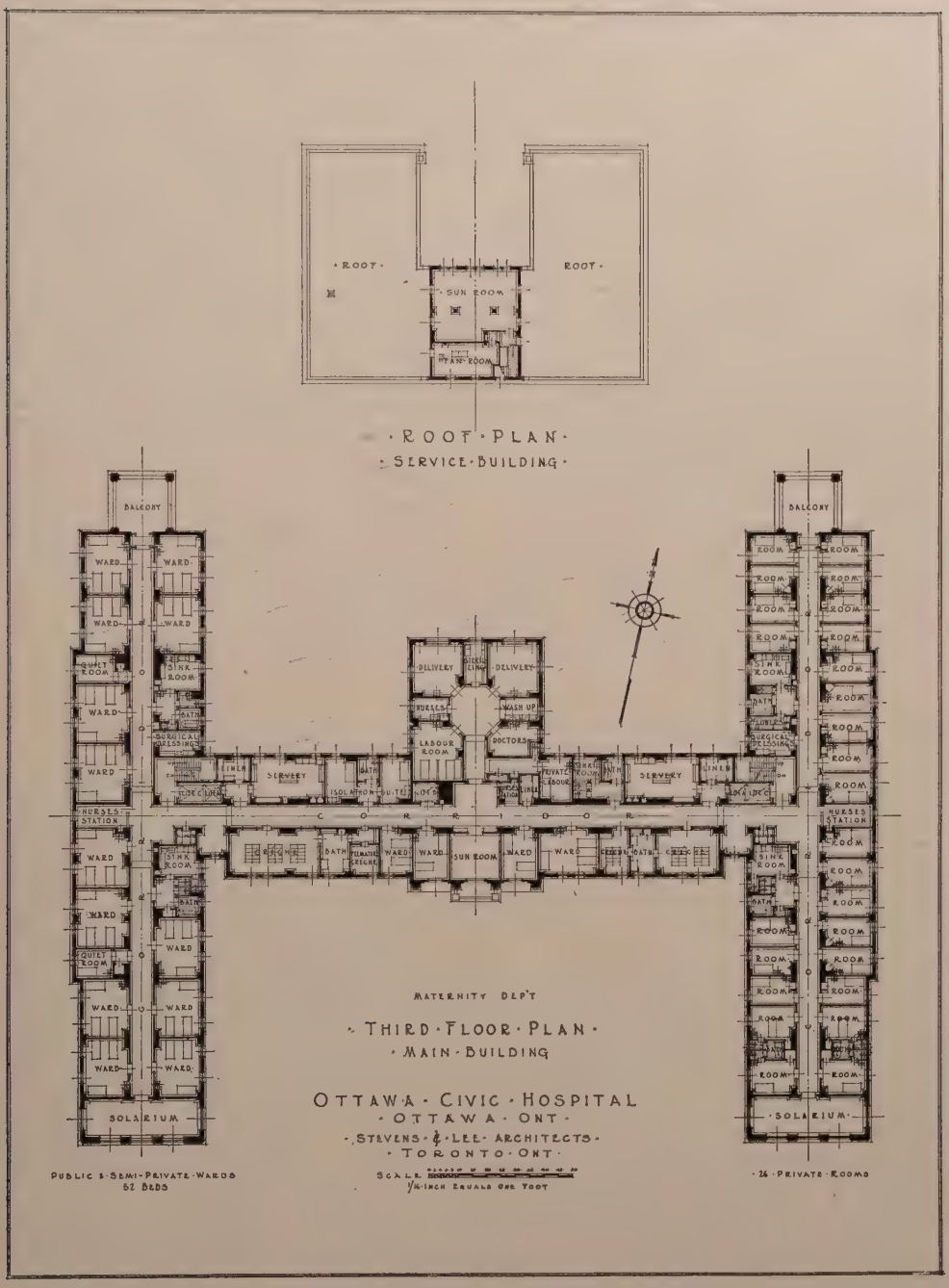



FIG. 88. THIRD FLOOR, OTTAWA CIVIC HOSPITAL, OTTAWA, CAN.

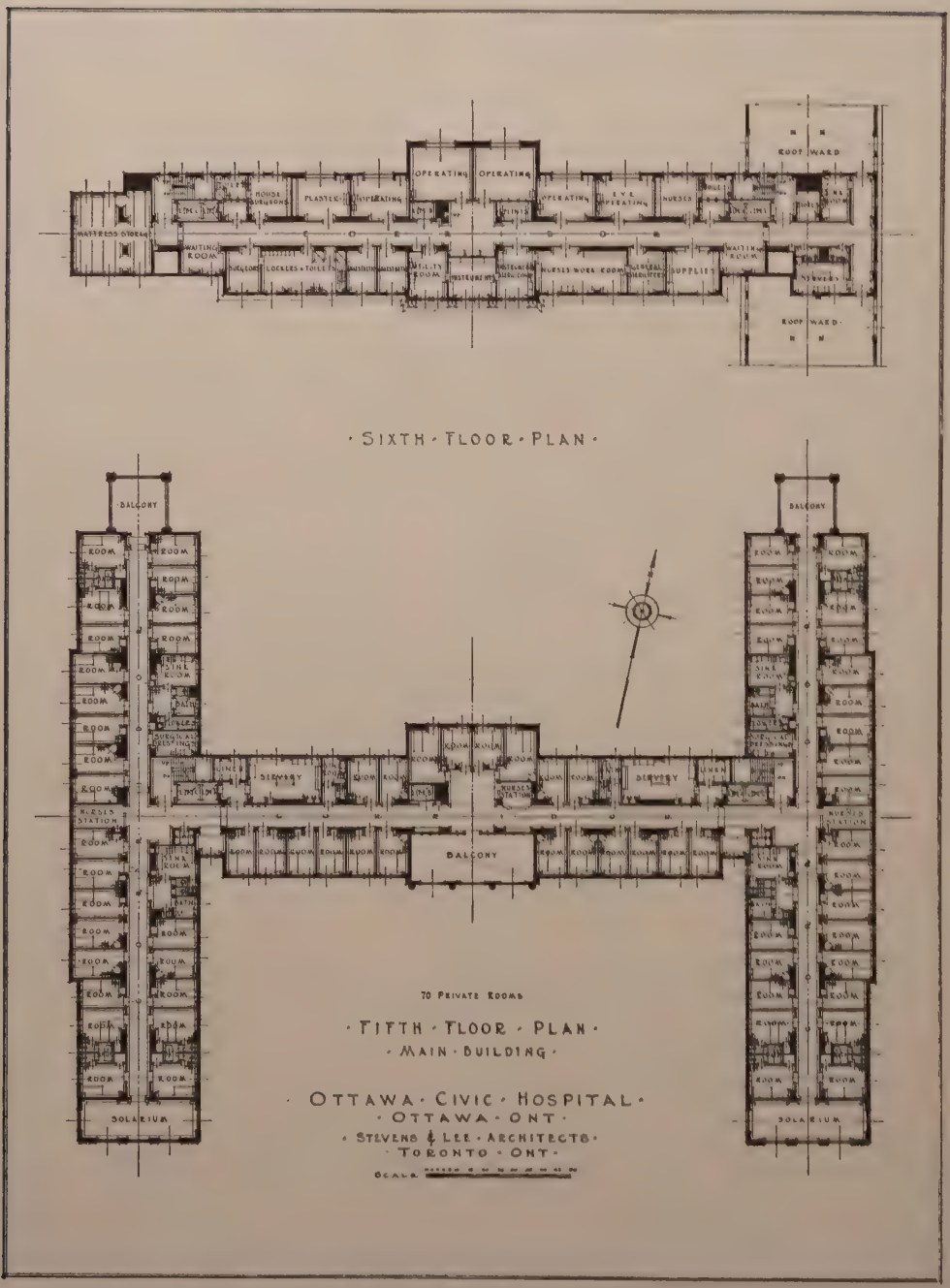



FIG. 89. FIFTH AND SIXTH FLOORS, OTTAWA CIVIC HOSPITAL, OTTAWA, CAN.

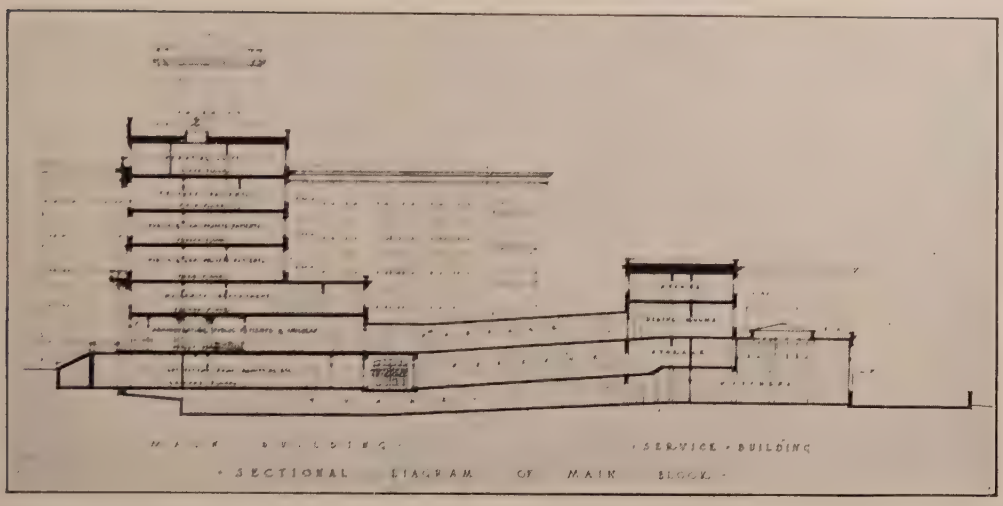



FIG. 91. OTTAWA CIVIC HOSPITAL, OTTAWA, CAN.

The right wing is for charity patients only. The basement floors are used for consultation, emergency beds and a free dispensary. The second and third floors hold one hundred charity beds, conveniently arranged, with one to twelve beds per room. The roof garden, to which the patients have access for fresh air and sunshine, is reached by an elevator.

In the left wing, the basement floor for the present will furnish space for kitchen, dining rooms and domestic service. The second and third stories contain thirty-two rooms for pay service; and the fourth floor, in the form of a roof garden, furnishes outing space, sunshine and fresh air for the patients below and can be reached by means of an elevator from the wards.

In the GERMAN HOSPITAL in Chicago (Figs. 97 and 98), which is of the L-shape plan, the architects have designed the private and public wards in different sections of each floor, giving an excellent chance for segregation and treatment of diseases. In the public ward portion, six-bed wards are the largest. The placing of the elevator and staircase in a separate space, and grouping about these the utility rooms, must tend to minimize disturbance from the noises. Each floor is provided with two suites, with bath and toilet connecting, so arranged, however, that the waterclosets and bowls are separated from the tub, making it possible to use the suites as private rooms. The maternity and operating departments are on the fourth floor, with proper shut-offs and segregation of the noisy portions of the maternity department.

The Fifth Avenue Hospital, New York City (Figs. 99-102A), is an example of a self-contained hospital planned, like the University College Hospital of London, to provide a maximum of light and air on a restricted city plot. The sub-basement contains the boiler and machinery rooms; the basement houses the kitchen, laundry and storerooms; the offices, dining-rooms and internes' quarters are on the first floor; the hospital proper occupies from the second to the eighth floors, with nearly all private rooms, constituting a "hotel hospital." The ninth floor is occupied by nurses' bedrooms, class and demonstration rooms.

FIG. 92. EXTERIOR, OTTAWA CIVIC HOSPITAL, OTTAWA, CAN.
Stevens & Lee, Architects. J. Albert Ewart, Associate

The main building of the Salem Hospital, Salem, Massachusetts (Figs. 103-106), presents a good example of how all departments may be planned for under one roof. There is a complete administration department, men's and women's medical and surgical, with provision for isolating venereal or other cases, a children's department, a maternity department with two delivery rooms and a separate section for private patients. There are extensive balconies. The utilities are well placed.

The Ohio Valley General Hospital (Fig. 111) was built on one of the many hills of West Virginia, which made it necessary to

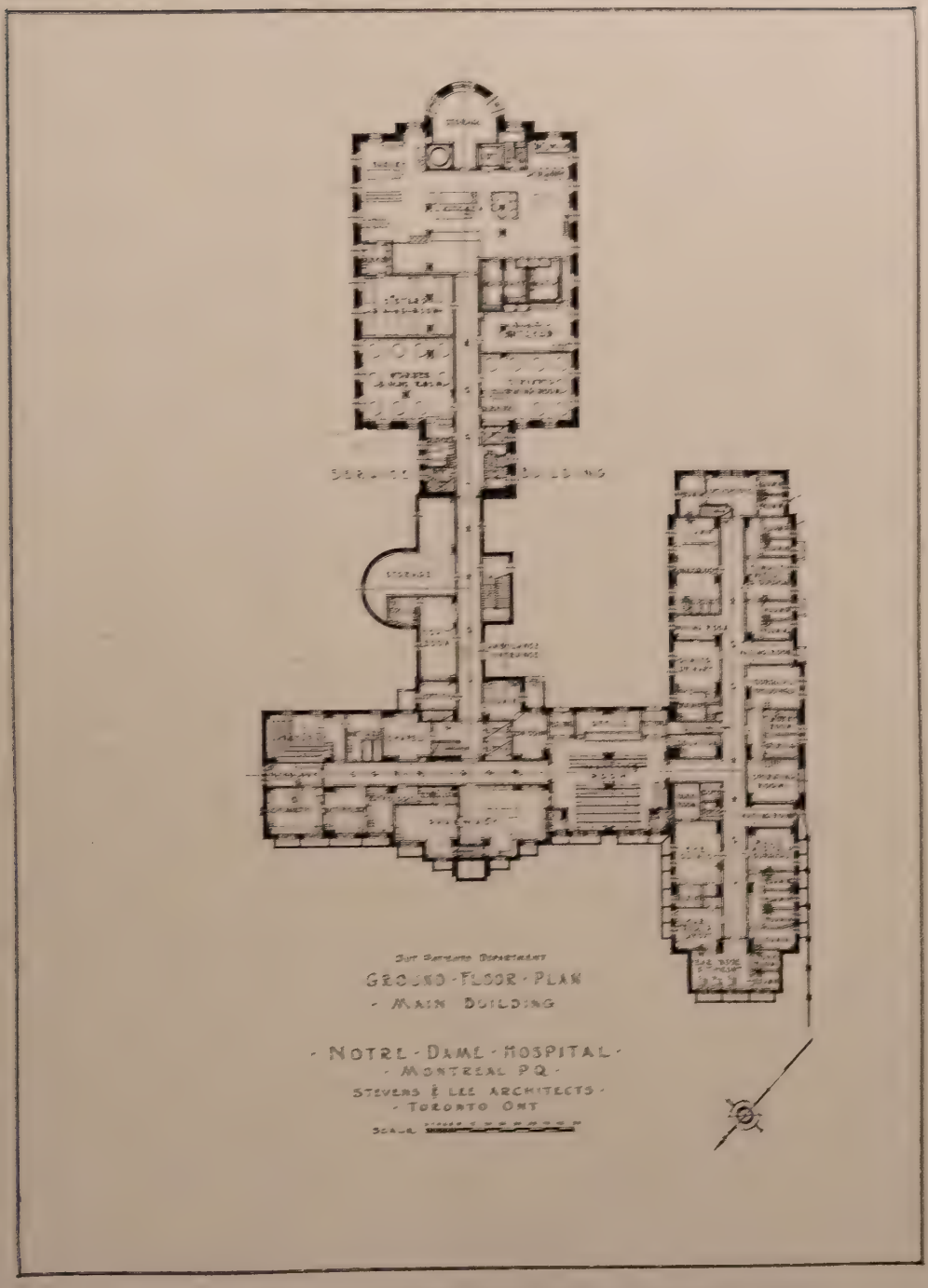



FIG. 93. GROUND FLOOR, NOTRE DAME HOSPITAL, MONTREAL, CAN.

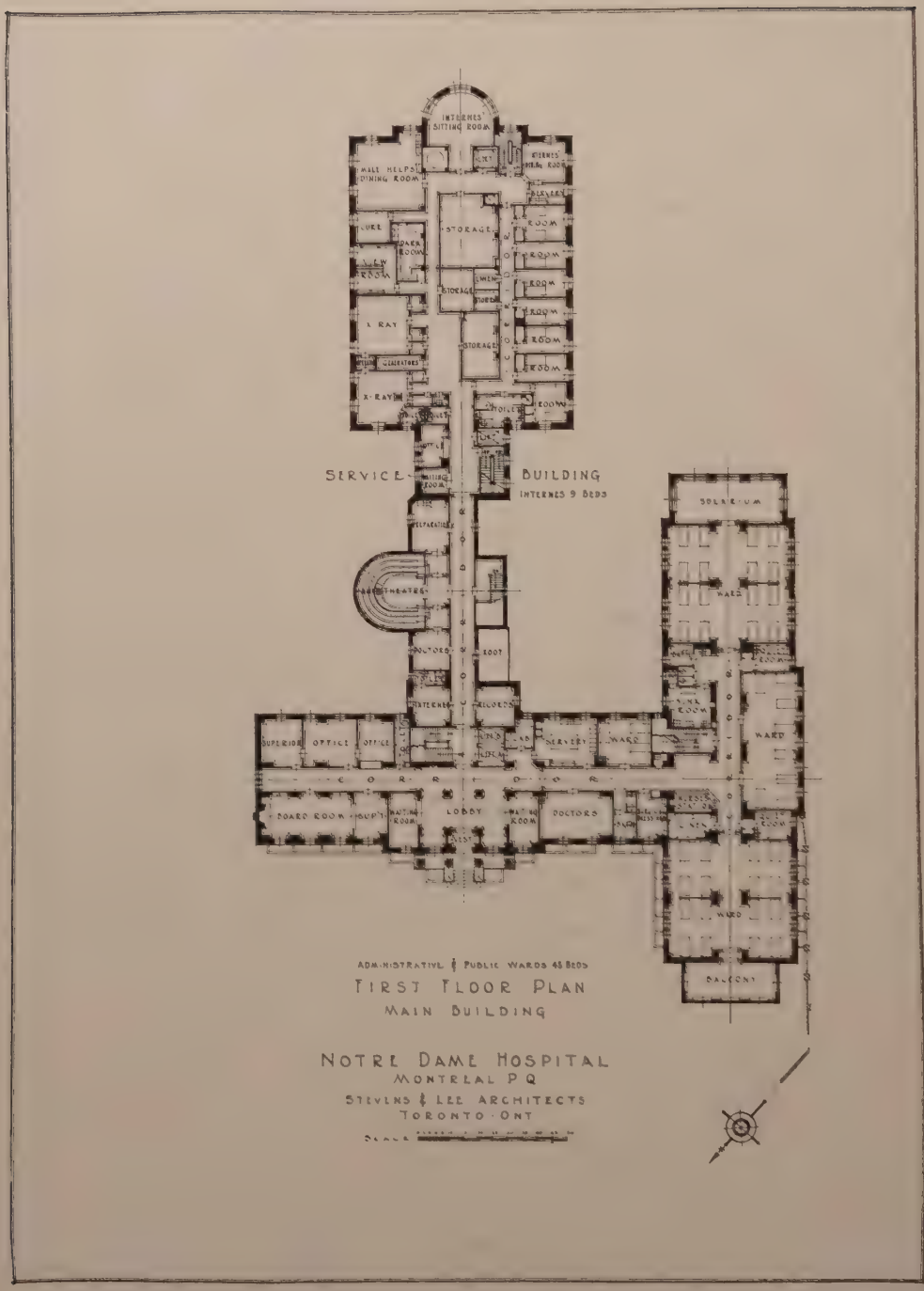



FIG. 93A. FIRST FLOOR, NOTRE DAME HOSPITAL, MONTREAL, CAN.

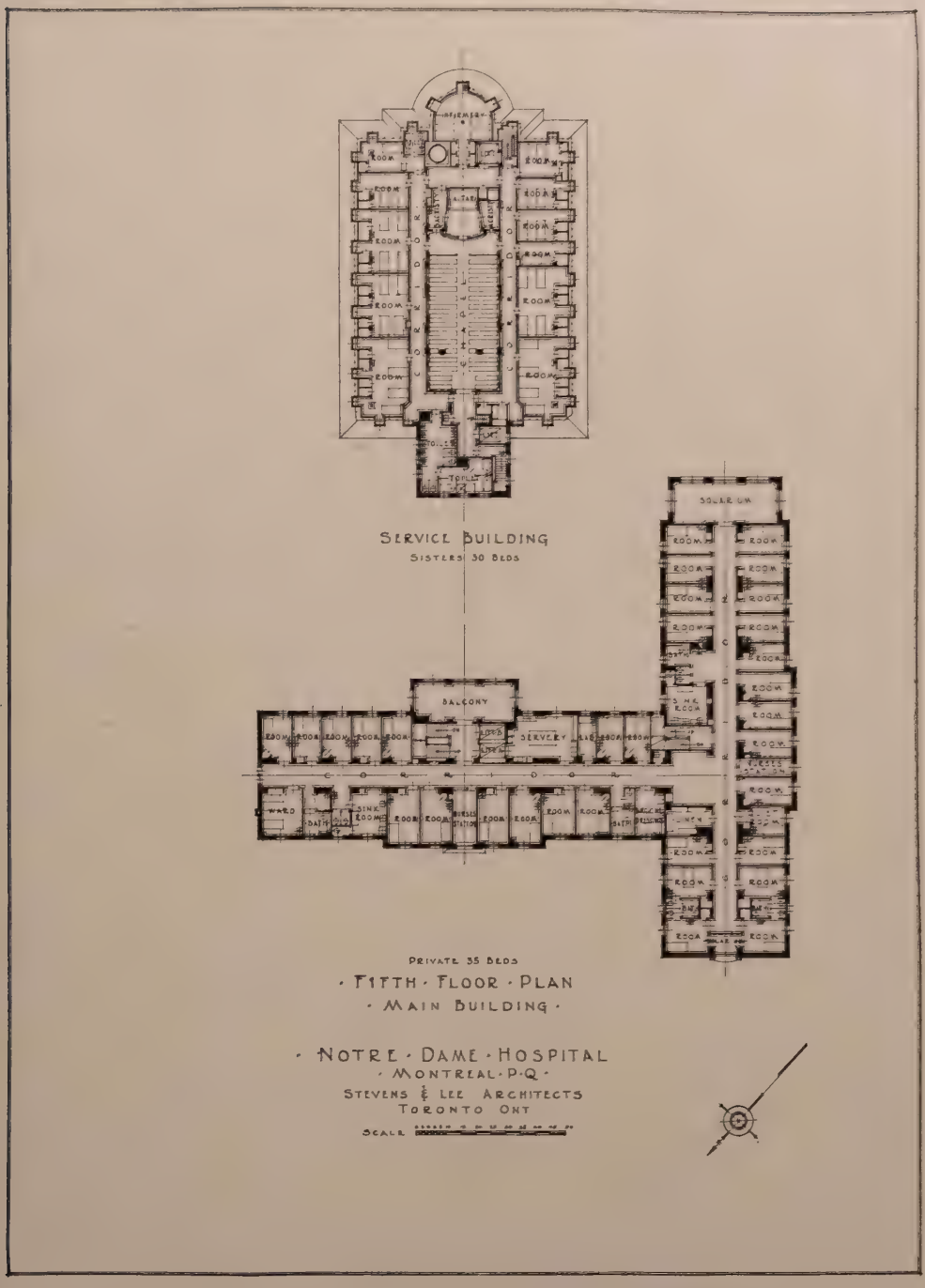



FIG. 94. FIFTH FLOOR, NOTRE DAME HOSPITAL, MONTREAL, CAN.

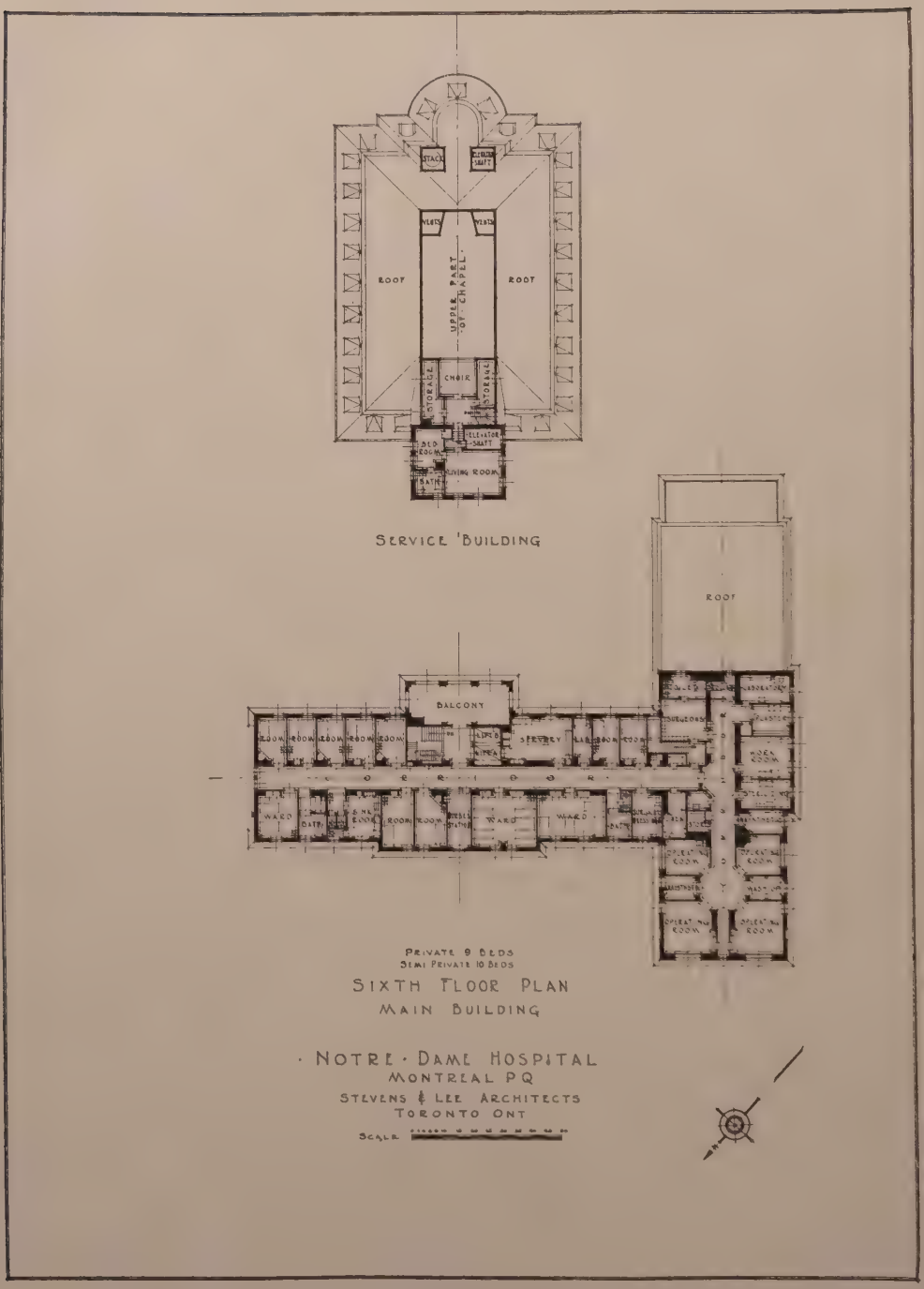



FIG. 95. SIXTH FLOOR, NOTRE DAME HOSPITAL, MONTREAL, CAN.

FIG. 95A. EXTERIOR, NOTRE DAME HOSPITAL, MONTREAL, CAN.

utilize the various grades of the streets surrounding the site. An almost precipitous cliff at the north determined the outline of the north wing.

The hospital is a block type, self-contained institution. It is planned to care for all departments of a general hospital—out-patients, accident, surgical, medical, maternity, children's, contagious—as well as for the segregation of colored patients. It is also provided with heating, lighting, and refrigerating plants, as well as a distilling plant for distilling all the drinking water and that used in connection with the surgical departments.

In planning this institution, it was decided to have no wards larger than eight beds, as a better segregation of cases could be obtained than by using large wards. This being a general hospital, both private and charity cases are cared for.

Provision is made on every floor for airing balconies (Fig. 112) so that all patients can be wheeled into the open when desired. A large roof ward is provided on the upper story.

The combining of the contagious department (Fig. 110) with the general hospital within the same walls is practiced here without any serious complications or cross infections.

The Macon Hospital (Fig. 114), like many another institution throughout the United States, found that its work was deficient on account of lack of better facilities for the care of the sick; additional land was secured in two different directions and the development of the institution has been attempted. The old buildings, A, B, and C, have been remodeled and put into working condition. The ward unit in building B has been rearranged on the "Rigs" type, providing for sixteen beds, with quiet rooms and utilities, while the old children's ward has been made into a modern serving kitchen. The old staircases and general partitions in A, B, and C have been largely retained, but the utilities have been enlarged.

FIG. 96. GALLOWAY MEMORIAL HOSPITAL, NASHVILLE, TENN.
Samuel Hannaford & Sons, Architects

Pavilions D, E, and F are new. Pavilion D is practically for private patients, and consists of private rooms and the general utilities. Pavilion F is designed for colored patients, who in southern sections, of course, must be segregated from the white patients. The service building, E, contains the kitchen, dining-room, laundry, power plant, and garage, and is located centrally with respect to the whole group.

The ground floor of the pavilion for negroes, F, is devoted to an out-patient department, which will be described in another chapter.

The third floor of pavilion D consists of children's and operating departments, which are described in their proper places. The roof ward (Fig. 117) is provided with ample facilities for outdoor treatment, and is connected directly with the serving kitchen, elevator, and staircase.

FIG. 97. THIRD FLOOR, GERMAN HOSPITAL, CHICAGO, ILL.
Richard E. Schmidt, Garden & Martin, Architects

The Mansfield General Hospital, at Mansfield, Ohio (Fig. 119), is another example of the self-contained type, with all departments in one building. In this hospital the attempt has been made to segregate, so far as possible, the divisions of male, female, children's, and maternity; and with the T-shape plan which is here adopted this was found to be a comparatively easy problem to solve. A central serving kitchen serves all of the three different departments on each floor. A separate sink and toilet room, however, is provided in each unit. The nurses' station is located in the center, from which point it is possible to observe the three wings of the building. The main offices are located on the first floor; and a small out-patient department, a medical treatment, Roentgen-ray department, the heating plant and the kitchen are located on the ground floor. The contour of the site selected allows for good lighting in all departments.

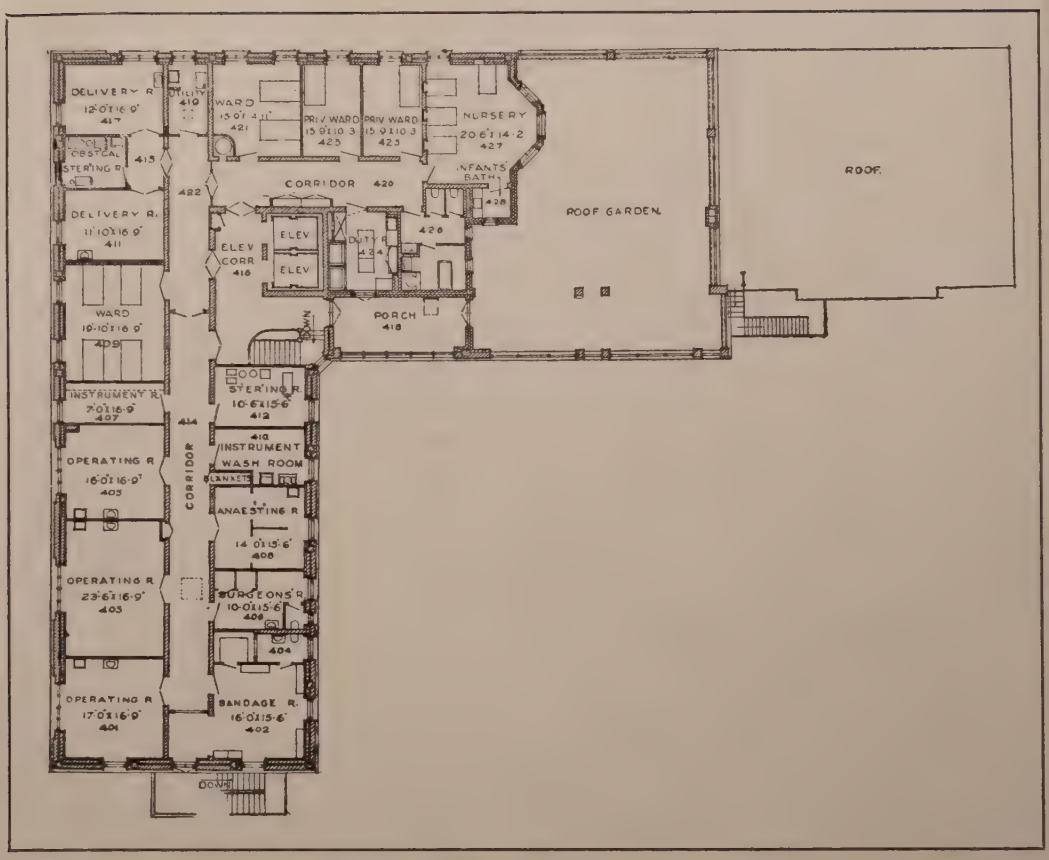



FIG. 98. GERMAN HOSPITAL, CHICAGO, ILL.

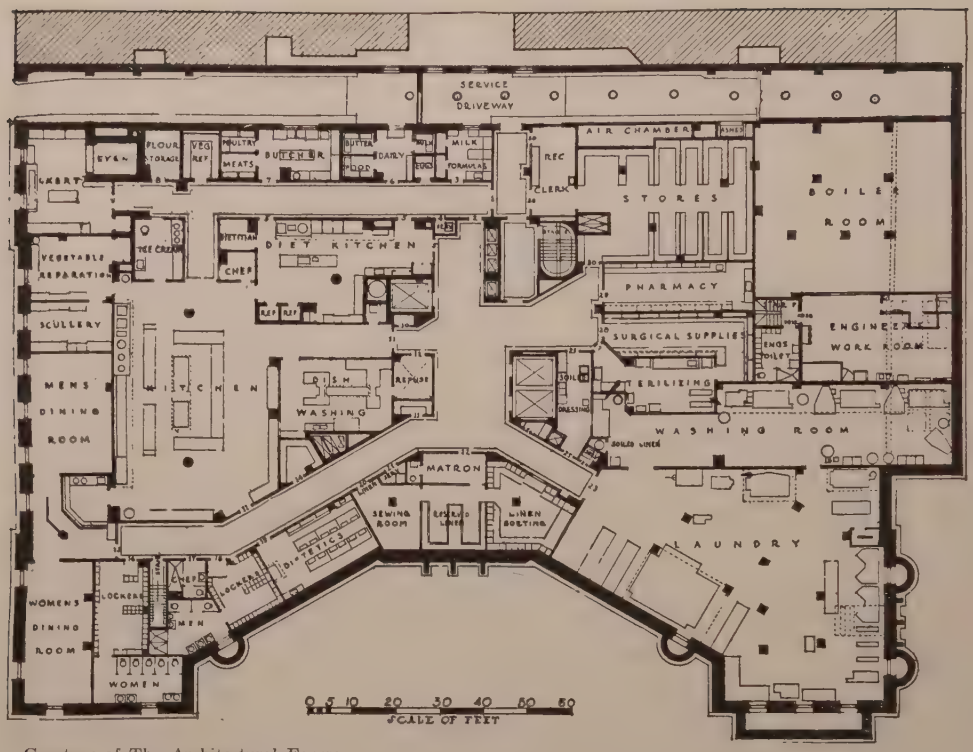
On the second floor (Fig. 120) are located the maternity department and private rooms and suites; and shut off and isolated from the rest of the building is the operating department. The maternity delivery room is placed within the operating section, making it possible to utilize the sterilizing room, the doctors' waiting-room, and the other equipment of the operating department in connection with the obstetrical work.

In the Illinois Central R. R. Hospital, Chicago, the ward unit is somewhat unusual, as there are no large wards. The greatest number of beds in any ward is four, while the majority of the rooms are for individual patients.

Like some of the other hospitals described, the basement and first floor are devoted to administration and medical treatment, and there are no patients' rooms below the second floor. The entrance lobby is large and generous, giving the would-be patient the idea of hospitality.

Courtesy of The Modern Hospital

FIG. 99. EXTERIOR, FIFTH AVENUE HOSPITAL, NEW YORK, N. Y.
York & Sawyer, Architects




Courtesy of The Architectural Forum

FIG. 100. BASEMENT PLAN, FIFTH AVENUE HOSPITAL, NEW YORK, N. Y.
York & Sawyer, Architects

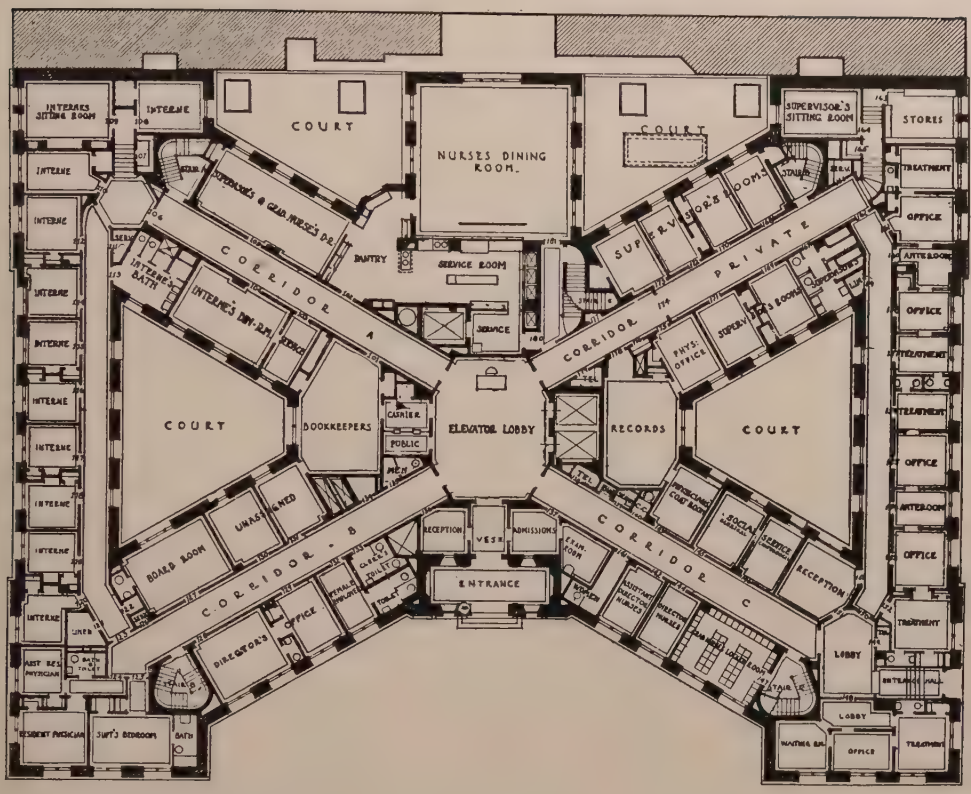
On the first floor (Fig. 121), besides the general office, reception rooms, etc., are located the laboratory, the hydrotherapeutic, Zander room, and X-ray room, together with rest room, toilets, etc., for the medical treatment department. On this floor is also located a small out-patient department, with waiting and treatment rooms; also rooms for the internes and chief surgeon.

The kitchen, scullery, diet kitchen, disinfecting room, mortuary, etc., are located in the basement.

The ward utilities are sufficiently isolated from the public corridor. The elevator and staircase-hall are placed in a separate tower.

On the third floor (Fig. 122) is located the operating suite, consisting of three operating rooms, nurses' work room, sterilizing room, anæsthetizing room, utility room, and surgeons' locker room, the surgeons' scrub-up being placed at the end of the main operating corridor. Built-in cabinets, blanket warmers, etc., make this a most complete unit.

The heating plant and laundry are in an entirely separate building.




Courtesy of The Architectural Forum

FIG. 101. FIRST FLOOR PLAN, FIFTH AVENUE HOSPITAL, NEW YORK, N. Y.
York & Sawyer, Architects

The demand for a private ward unit in Canada's great hospital, the ROYAL VICTORIA, in Montreal, was so great that one of her most generous-hearted sons has provided the means for building a complete and thoroughly equipped private patient pavilion for this institution (Figs. 123-127).

The general plan (Fig. 10) shows the location in connection with the existing hospital. It has been necessary to plan with precipitous grades, and the approach to this pavilion from the main hospital is over a bridge from the second story of the original building; thence through the tunnel into the mountain; thence, by means of elevators and staircases, to the various floors of the new pavilion.

The medical treatment department (Fig. 179) of this building is as complete as that of any of its kind in America, for the authorities of the hospital realized that the physician should have greater oppor-

Courtesy of The Architectural Forum

FIG. 102. SECOND FLOOR PLAN, FIFTH AVENUE HOSPITAL, NEW YORK, N. Y.
York & Sawyer, Architects

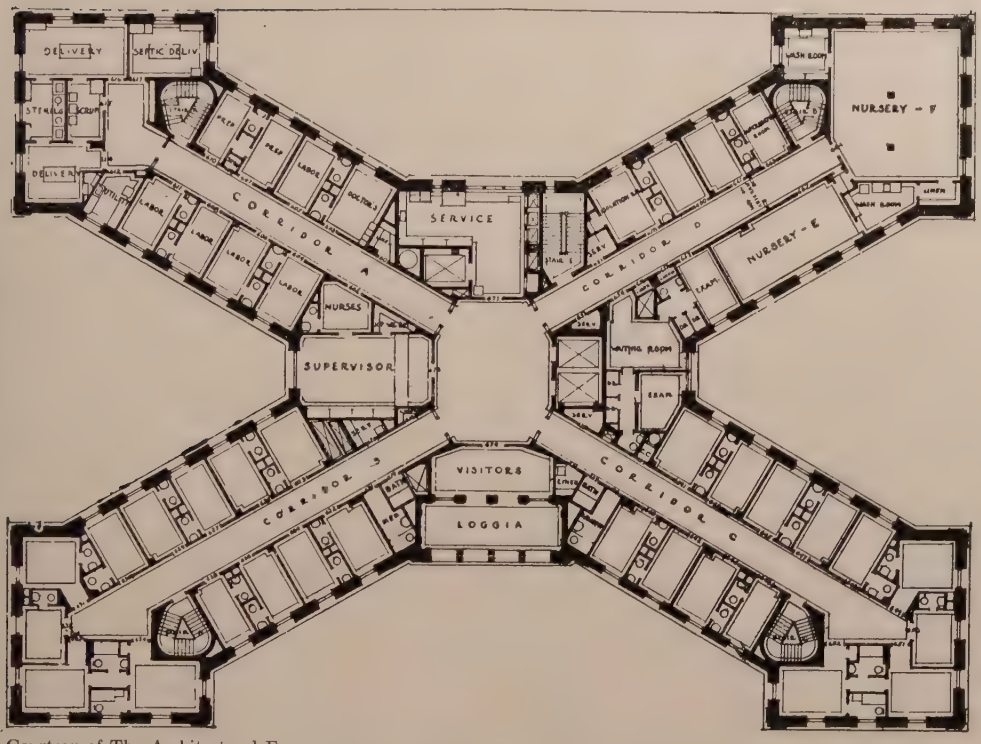
tunities for his work than are provided in the majority of medical institutions.

The surgical department (Fig. 125) is most complete. The system of lighting is entirely indirect, no lighting fixture being in the operating room, but all concealed behind the glazed ceiling.

A series of balconies from private rooms is arranged on all sides of the building, making it possible for the patients to have their own private balconies, just as they have their own baths and toilets. Additional airing balconies for every floor are provided.

Every room has double doors, and all partitions are double, so that one patient shall not disturb another. Each room has its telephone. There are thirty rooms with connecting baths. On the ground floor is a sitting room and a dressing room for special nurses.

In the planning of their new hospital, the Tampa city govern-




Courtesy of The Architectural Forum

FIG. 102A. TYPICAL FLOOR PLAN, FIFTH AVENUE HOSPITAL, NEW YORK, N. Y.
York & Sawyer, Architects

ment decided on a broad policy to provide hospitalization for a fast-growing community.

Erected on land that was non-existent at the time the project was launched, the TAMPA MUNICIPAL HOSPITAL, at Tampa, Florida (Figs. 127A-127F), occupies a commanding position at the city end of the new Davis Island, facing the city on one side and the "Aladdin" development on the other, and functions as a general hospital, with all the departments needed for modern medicine and surgery.

Designed in the Spanish style of architecture, and planned to accommodate 250 patients at the start, all units are so designed that the building may be increased to 500-bed capacity with slight changes from the original plan. The mechanical equipment is housed in an adjoining one-story building and a nurses' residence will be placed on an adjoining lot.

The plans show the distribution of departments. It will be noted that practically everything is above the grade and in order to provide against a possible flood or tidal wave, a vulnerable point is fixed

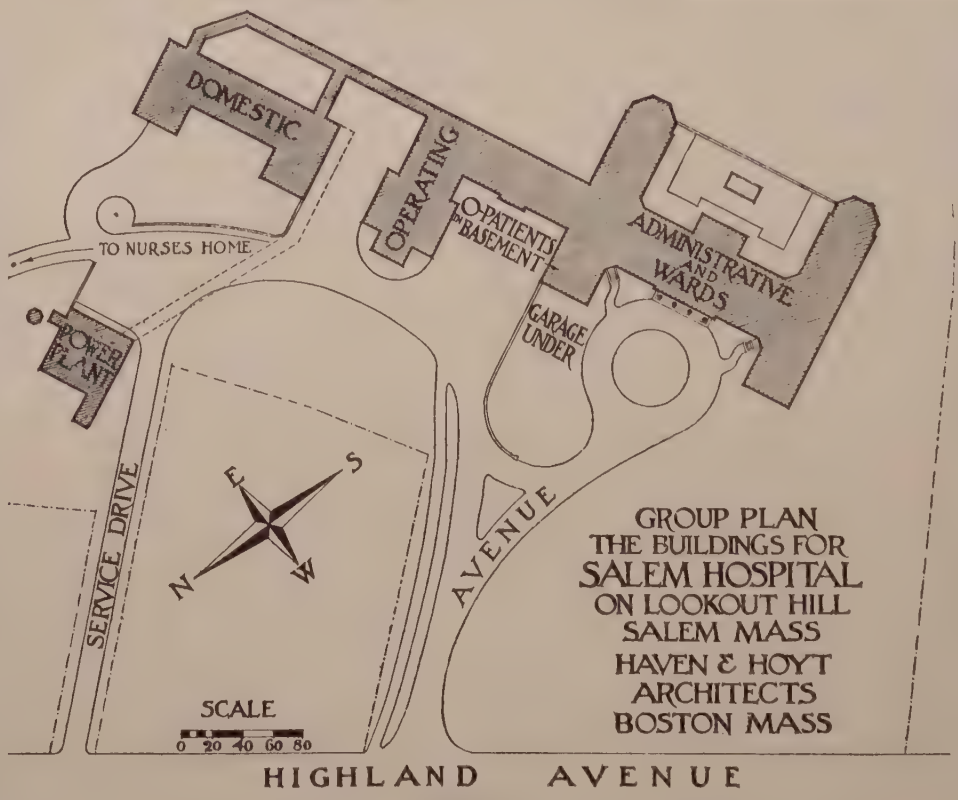



FIG. 103

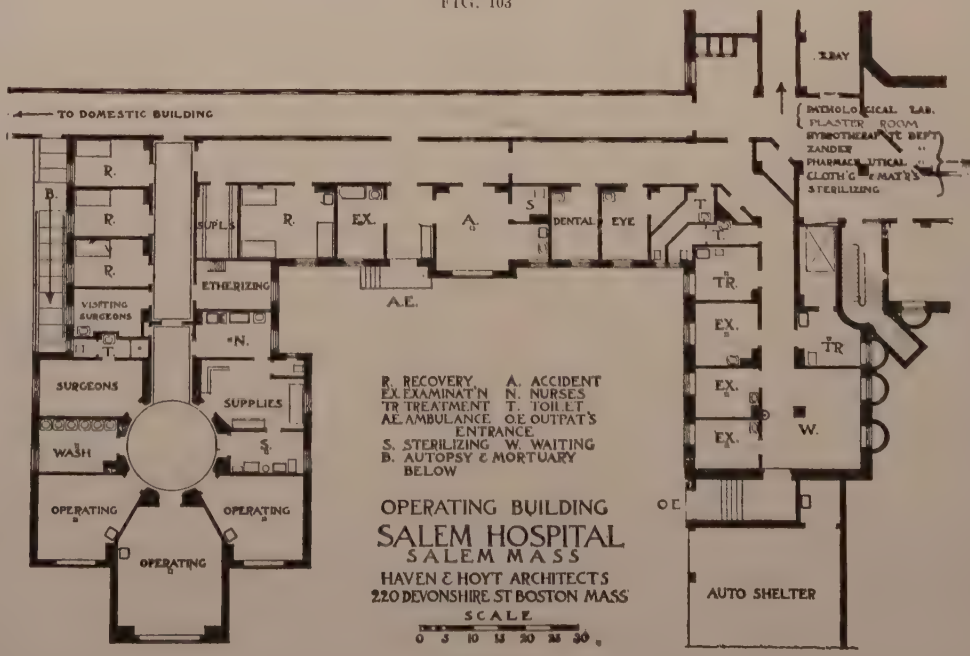



FIG. 104

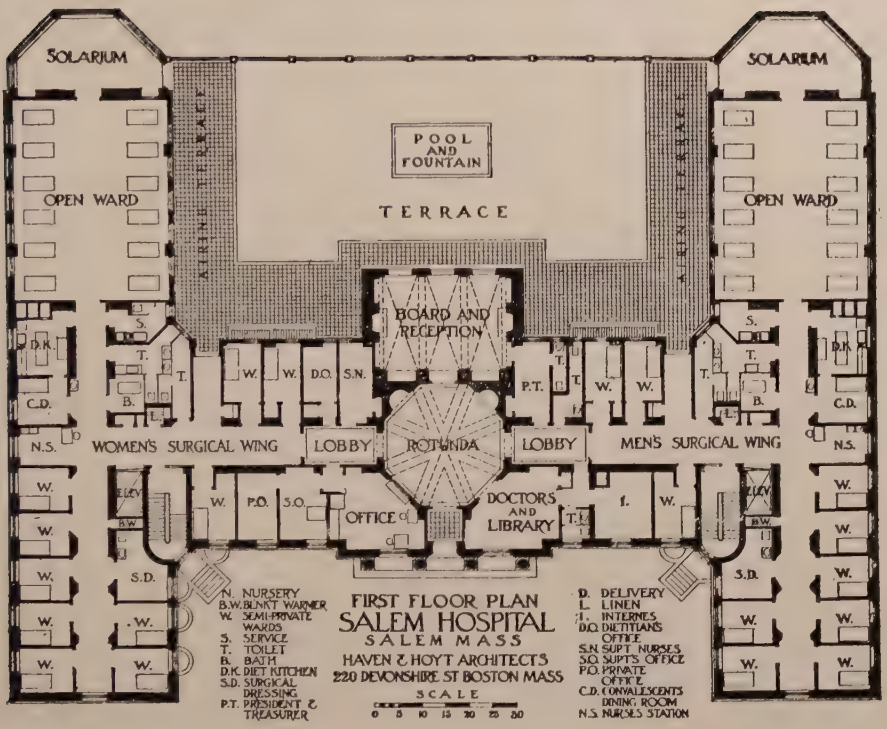



FIG. 105

FIG. 106. SALEM HOSPITAL
Haven & Hoyt, Architects

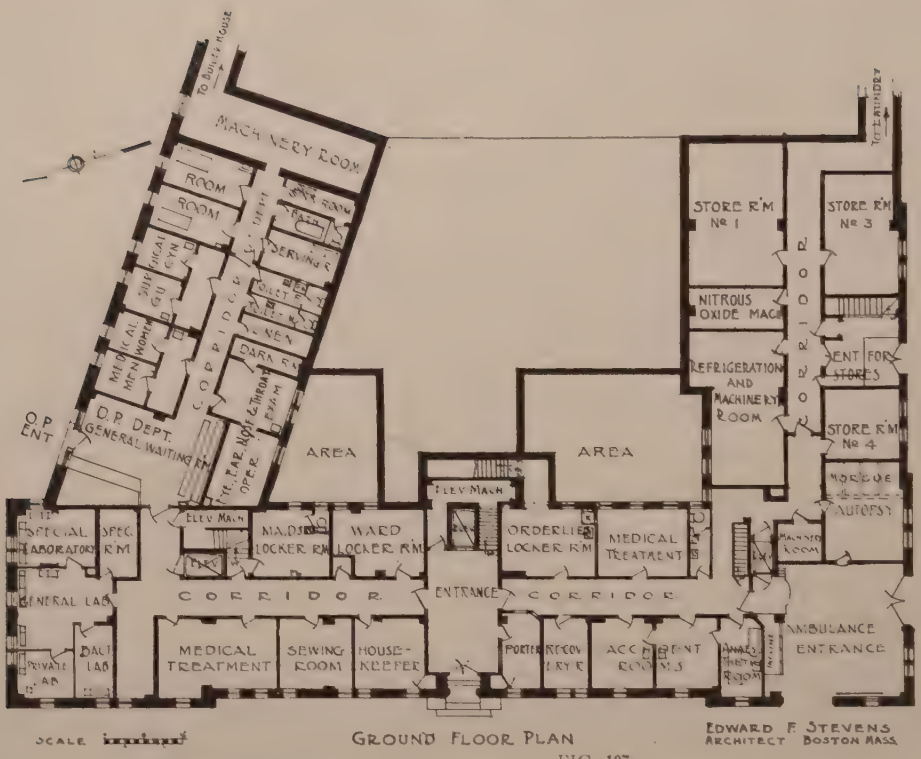



FIG. 107

OHIO VALLEY GENERAL HOSPITAL, WHEELING, W. VA.

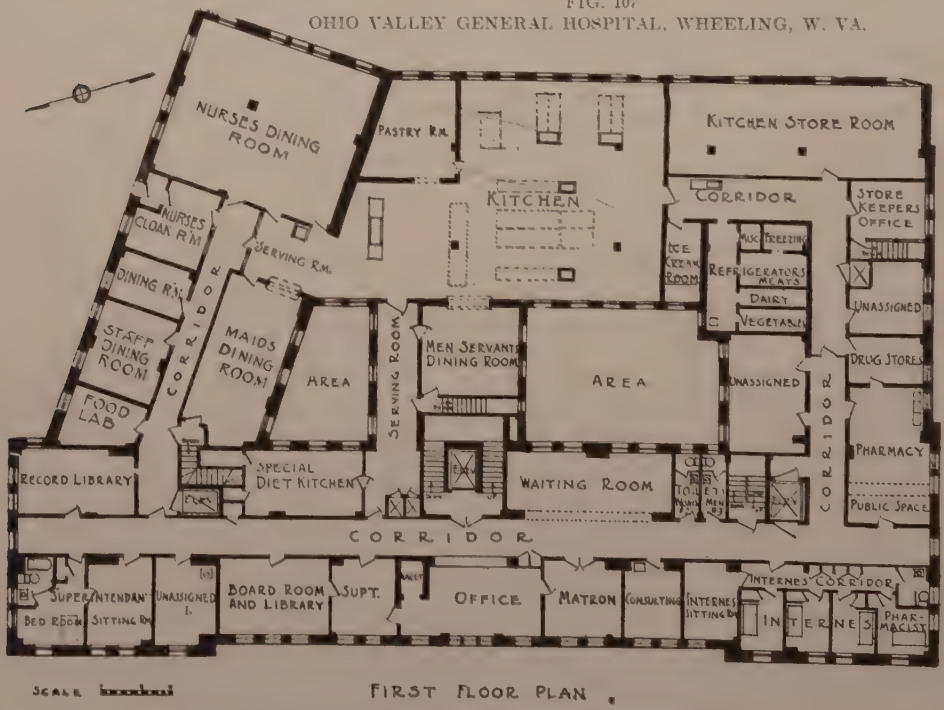
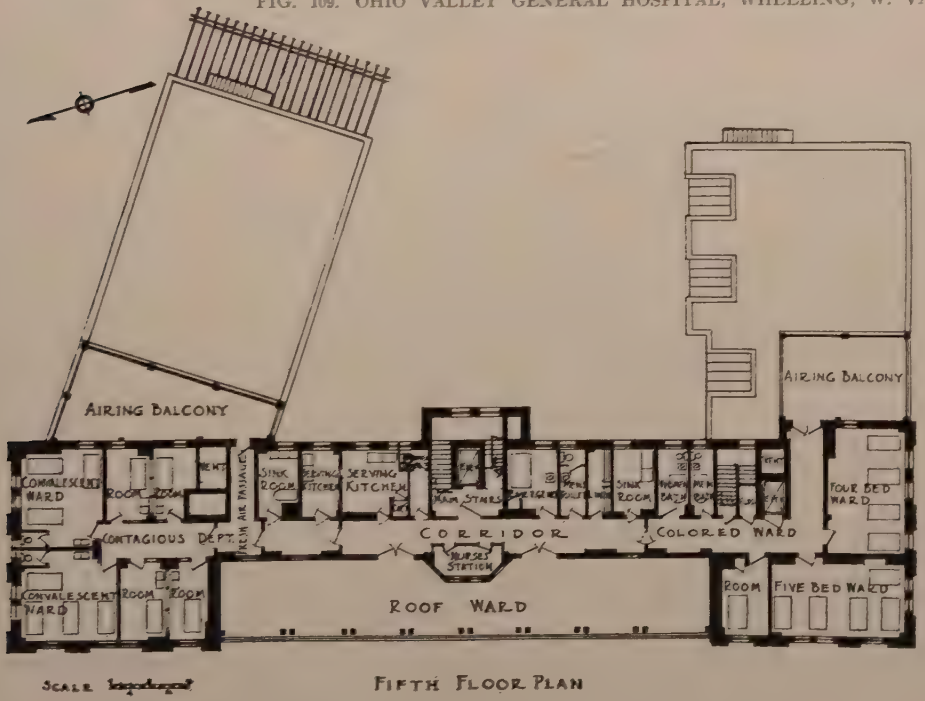



FIG. 108. OHIO VALLEY GENERAL HOSPITAL, WHEELING, W. VA.
Edward F. Stevens, Architect

SCALE

FOURTH FLOOR PLAN

FIG. 109. OHIO VALLEY GENERAL HOSPITAL, WHEELING, W. VA.




SCALE

FIFTH FLOOR PLAN

FIG. 110. OHIO VALLEY GENERAL HOSPITAL, WHEELING, W. VA.

FIG. 111. OHIO VALLEY GENERAL HOSPITAL, WHEELING, W. VA.
Edward F. Stevens, Architect

12 feet above low water. All openings below that level are built with waterproof walls or dikes, so that, while the surface of the island might be covered with water to a depth of 5 feet, not a drop of water would enter the hospital building.

To take advantage of location, light and air, a plan with "bent" pavilions was adopted.

The entire first floor is for service and contains the out-patient department, the administration department, and the domestic departments. In the latter are included the power plant, laundry, refrigerating plant, kitchen and dining-rooms.

On the second floor is a complete maternity department and on the sixth floor the operating department, combined with the X-ray and laboratories. This floor also houses a complete children's department and the isolation and psychopathic departments.

The third, fourth and fifth floors are given over to the care of patients. Each floor is planned with complete service units. There are no large wards, and each ward is connected directly to utility rooms. All private rooms have direct toilet connections. Day rooms and airing balconies are provided for the patients and their friends.

The Brandon General Hospital, Brandon, Manitoba (Figs.

FIG. 112. AIRING BALCONY, OHIO VALLEY GENERAL HOSPITAL, WHEELING, W. VA.

FIG. 113. VIEW FROM REAR SHOWING AIRING BALCONIES. OHIO VALLEY GENERAL HOSPITAL, WHEELING, W. VA.

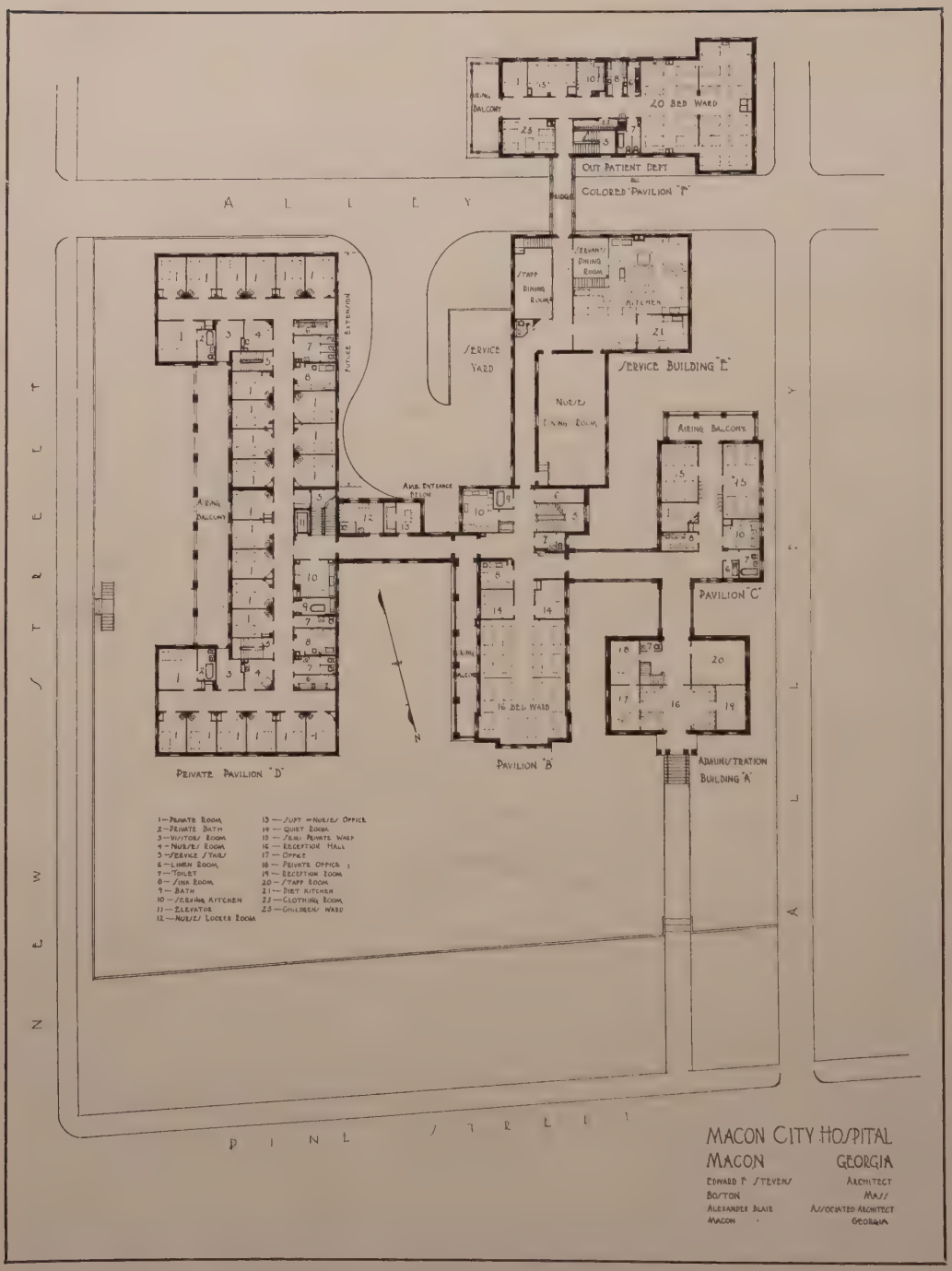



FIG. 114. FIRST FLOOR PLANS, MACON CITY HOSPITAL, MACON, GA.
Edward F. Stevens, Architect; Alexander Blair, Associate

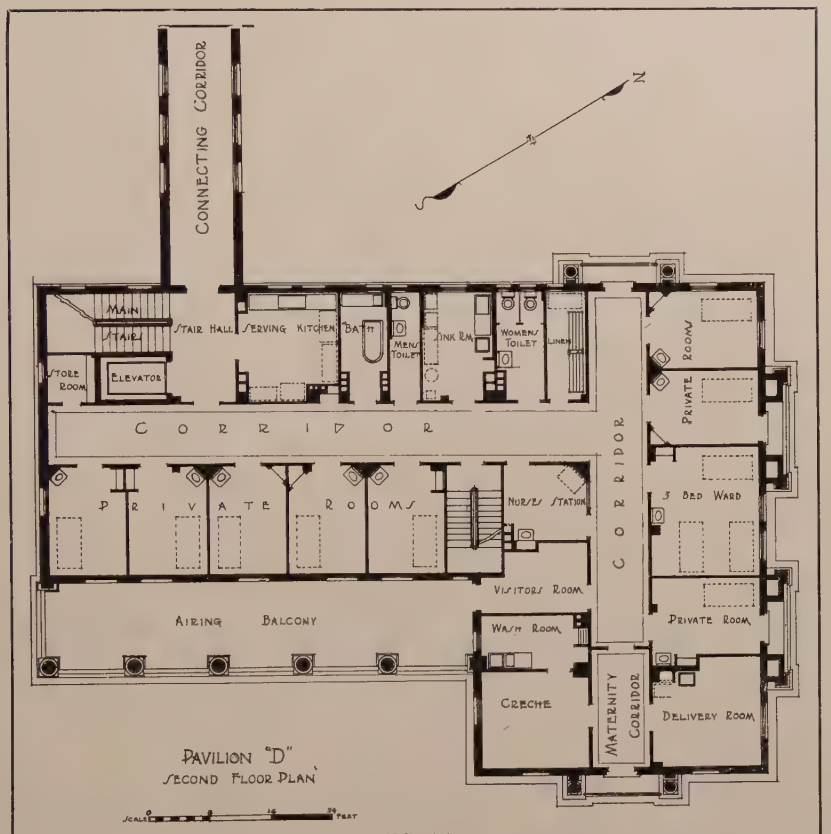



FIG. 115

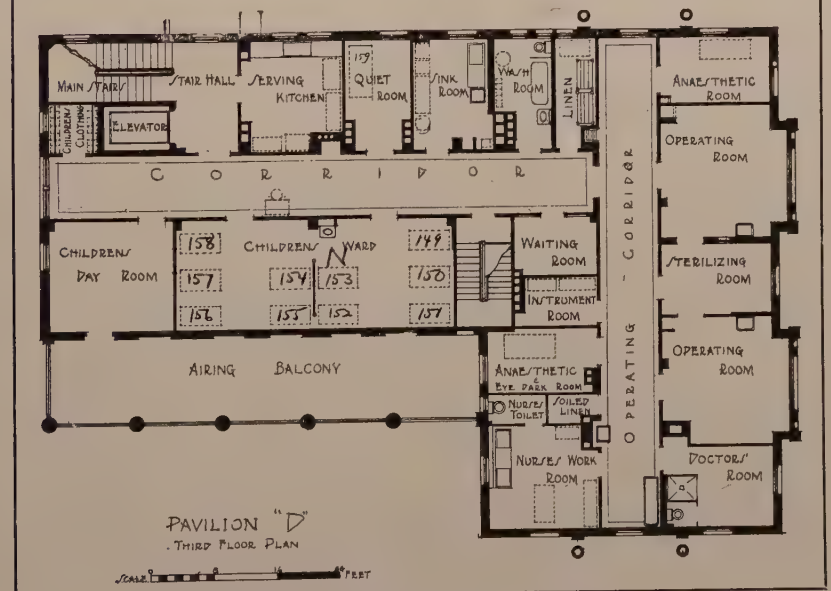



FIG. 116. MACON HOSPITAL, MACON, GA.
Edward F. Stevens, Architect; Alexander Blair, Associate

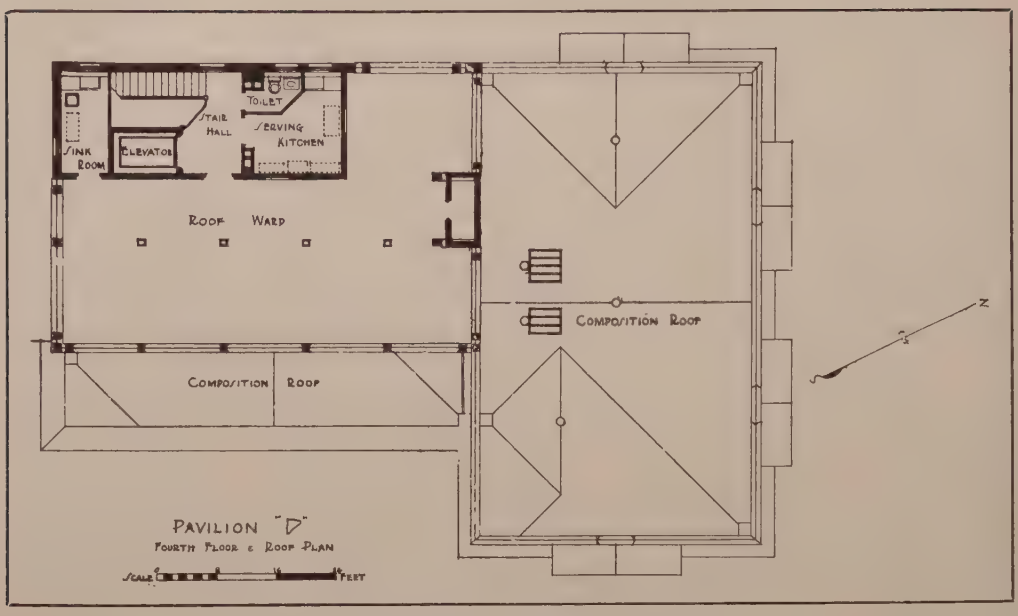



FIG. 117. MACON HOSPITAL, MACON, GA.
Edward F. Stevens, Architect; Alexander Blair, Associate

FIG. 118. EXTERIOR, MACON HOSPITAL, MACON, GA.

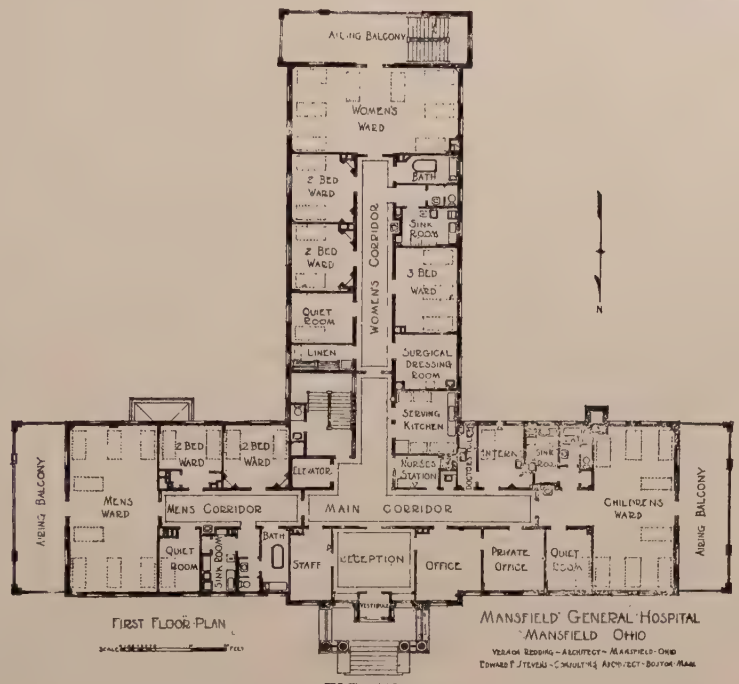



FIG. 119

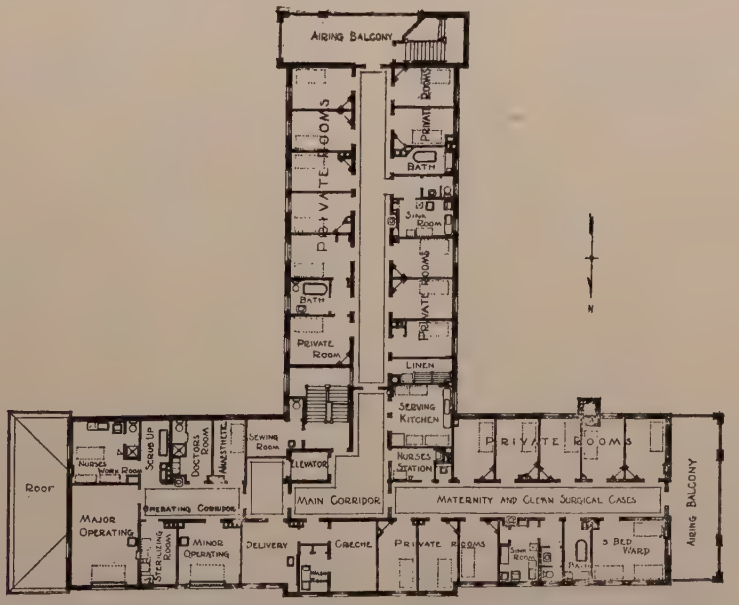



FIG. 120. MANSFIELD GENERAL HOSPITAL, MANSFIELD, OHIO, SECOND FLOOR PLAN
Vernon Redding, Architect; Edward F. Stevens, Consultant

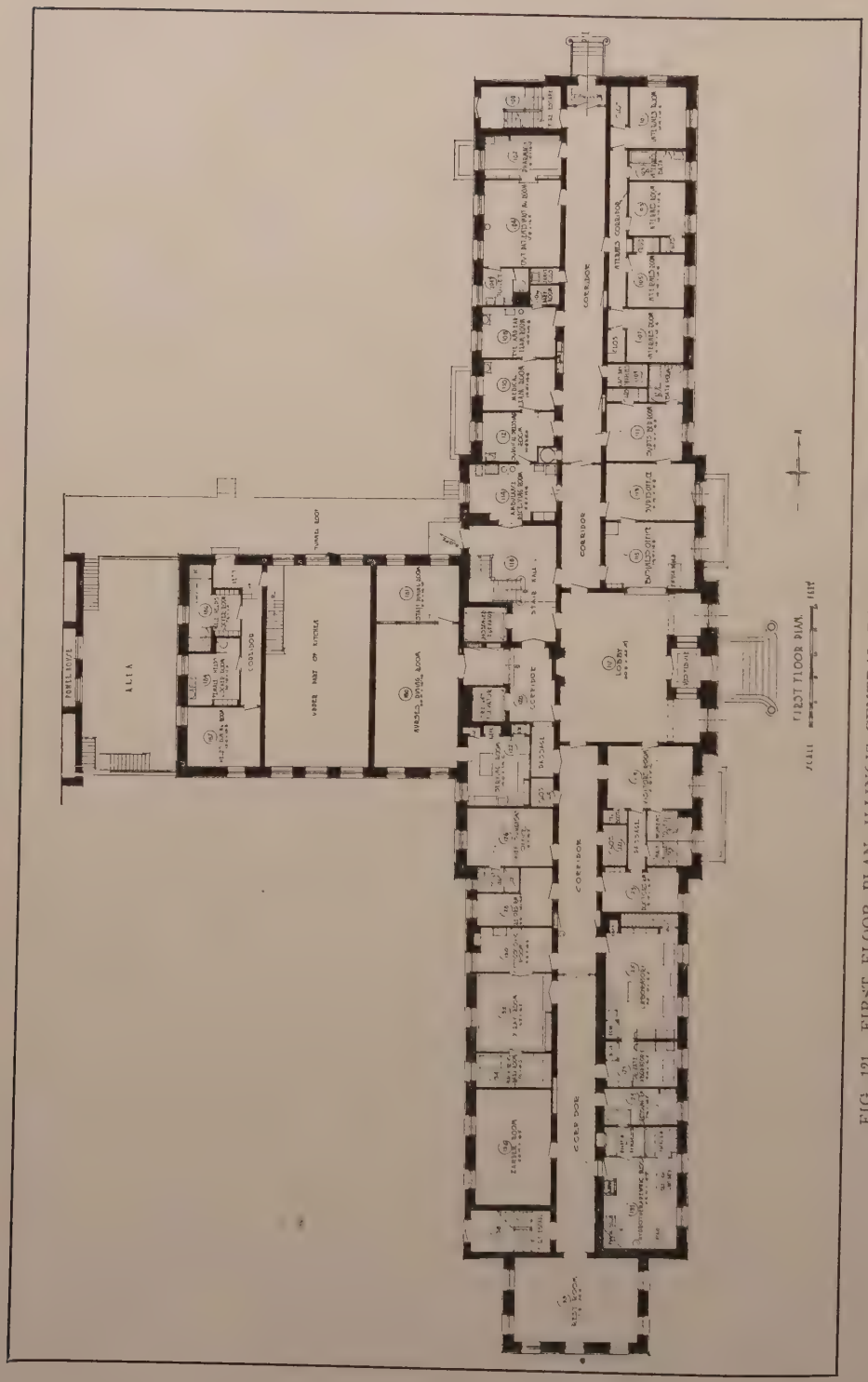

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FIG. 122. THIRD FLOOR PLAN, ILLINOIS CENTRAL RAILROAD HOSPITAL, CHICAGO, ILL.
Richard E. Schmidt, Garden & Martin, Architects, Chicago, Ill.

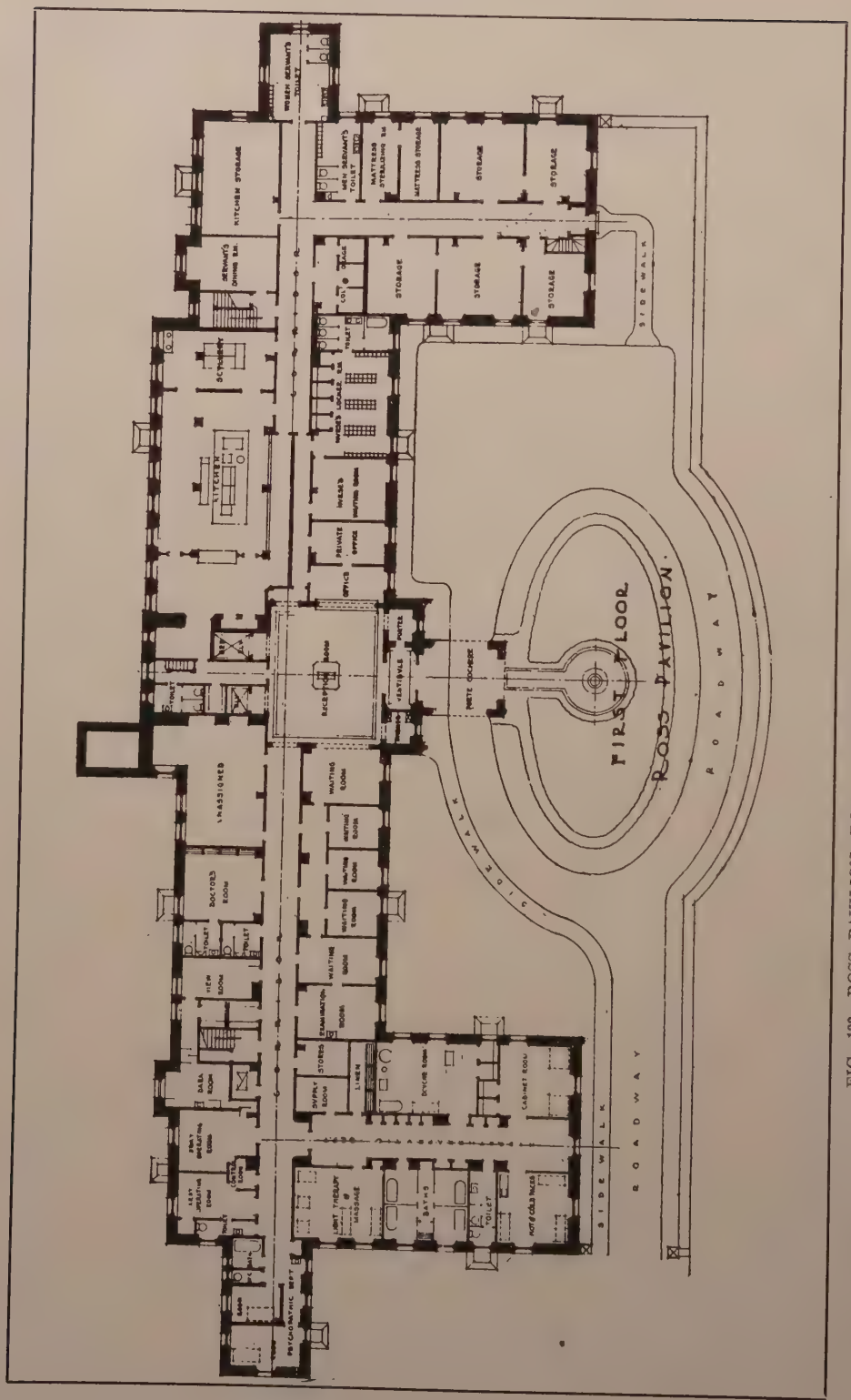



FIG. 123. ROSS PAVILION, ROYAL VICTORIA HOSPITAL, MONTREAL, CANADA
Stevens & Lee, Architects

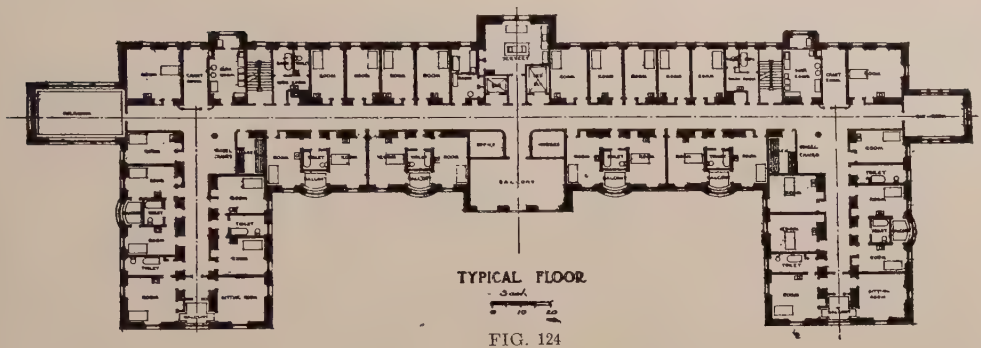



FIG. 124

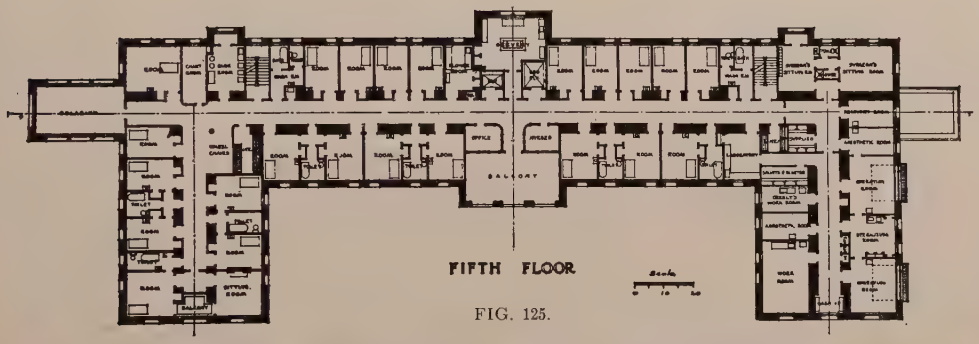



FIG. 125.

ROSS PAVILION, ROYAL VICTORIA HOSPITAL, MONTREAL, CANADA

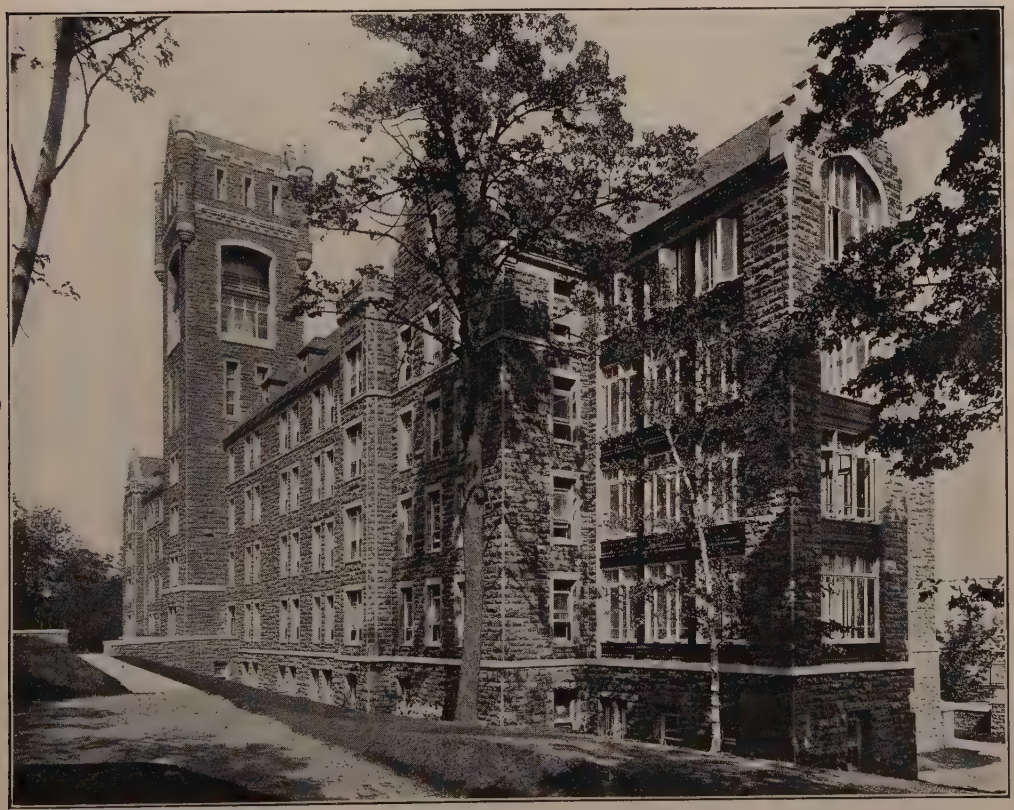


FIG. 126. WEST SIDE, ROSS PAVILION, ROYAL VICTORIA HOSPITAL, MONTREAL, CAN.
Stevens & Lee, Architects

FIG. 127. FRONT, ROSS PAVILION, ROYAL VICTORIA HOSPITAL, MONTREAL, CAN.
Stevens & Lee, Architects

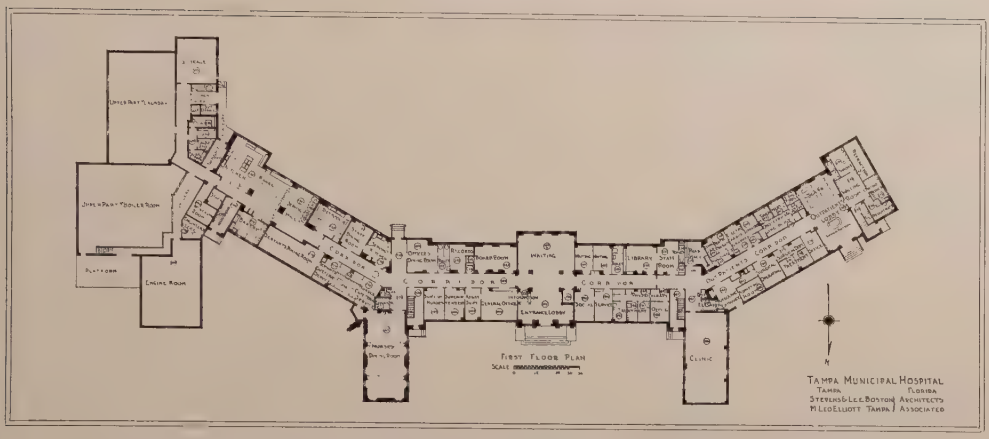



FIG. 127A. GROUND FLOOR, TAMPA MUNICIPAL HOSPITAL, TAMPA, FLA.
Stevens & Lee, Boston, Architects; M. Leo Elliott, Inc., Tampa, Associated Architects

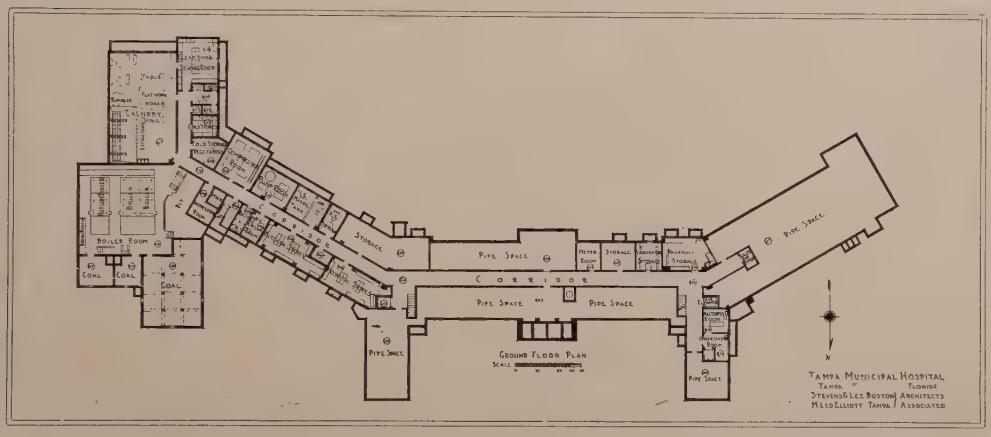



FIG. 127B. FIRST FLOOR, TAMPA MUNICIPAL HOSPITAL

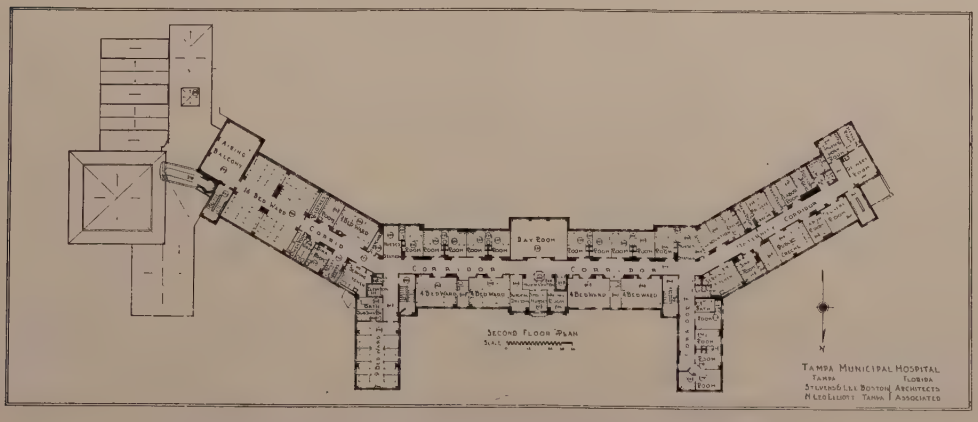



FIG. 127C. SECOND FLOOR, TAMPA MUNICIPAL HOSPITAL

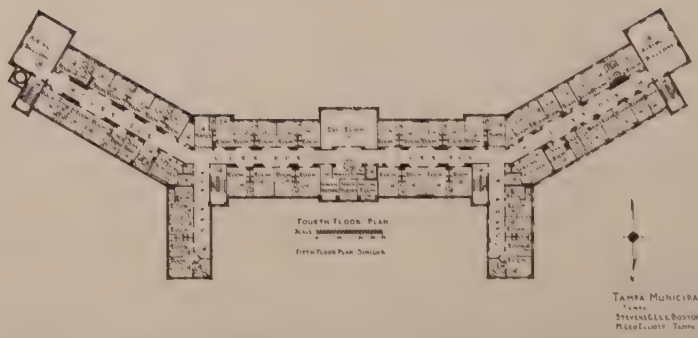



FIG. 127D. FOURTH FLOOR, TAMPA MUNICIPAL HOSPITAL

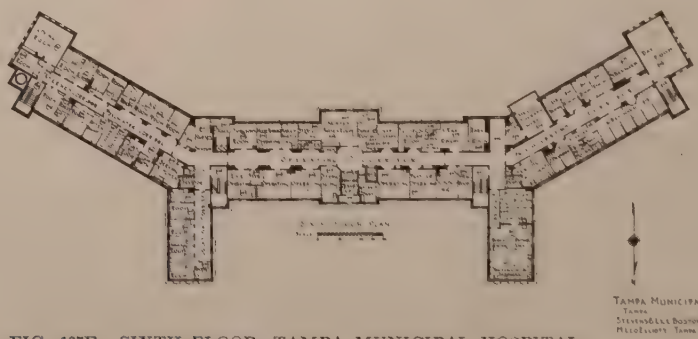



FIG. 127E. SIXTH FLOOR, TAMPA MUNICIPAL HOSPITAL

FIG. 127F. EXTERIOR, TAMPA MUNICIPAL HOSPITAL, TAMPA, FLA.
Stevens & Lee, M. Leo Elliott, Architects Associated

Courtesy of The Architectural Forum

FIG. 128. EXTERIOR, BRANDON GENERAL HOSPITAL, BRANDON, MANITOBA

Stevens & Lee, Architects

Courtesy of The Architectural Forum

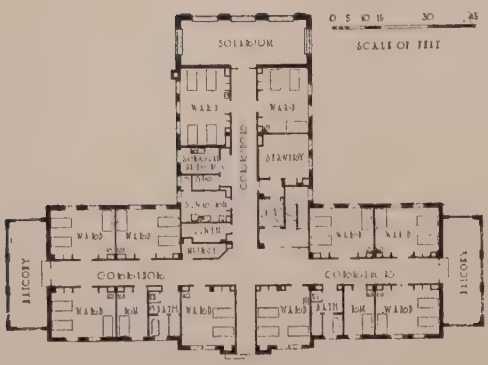
GROUND FLOOR

FIG. 129

FIRST FLOOR

FIG. 130

PLANS, BRANDON GENERAL HOSPITAL, BRANDON, MANITOBA




SECOND FLOOR PLAN

Courtesy of The Architectural Forum

FIG. 131

THIRD FLOOR PLAN

FIG. 132

PLANS, BRANDON GENERAL HOSPITAL, BRANDON, MANITOBA

128-132), is a self-contained hospital on a T-shaped plan. On the ground floor are laboratory, X-ray, pharmacy, kitchen and dining-rooms, also out-patient and isolation departments. On the first floor all offices are approached from a special corridor outside the main hospital corridor. The first and second stories contain wards, the third story private rooms and operating room.

In the Everett General Hospital (Figs. 133-137) at Everett, Washington, on Puget Sound, it was necessary to anticipate the needs of a rapidly growing city, and at the same time produce a well functioning hospital.

The entrance is designed to give an impression of friendliness and confidence; some decoration has been used here, and it is separated from the hospital proper by a large waiting-room. The ambulance entrance at the rear is near the administration department, yet not obvious from it.

The ground floor contains the kitchen, diet kitchen, storage rooms, laboratories, X-ray department, autopsy and a small isolation department. The first floor contains small wards with central utilities and additional sink rooms to save travel. The elevator and service staircase are cut off from the main corridor, as also is the admitting room; the elevator also opens directly into the serving kitchen. The nurses' station is centrally located.

The second floor is the maternity, with delivery rooms and creche well separated from the rooms and wards. The day room of the children's ward is charmingly decorated.

The third floor is entirely private rooms, some with baths, some

FIG. 133. EXTERIOR, EVERETT GENERAL HOSPITAL, EVERETT, WASH.
Stevens & Lee, Boston, Architects; Bebb & Gould, Seattle, Wash., Associated Architects

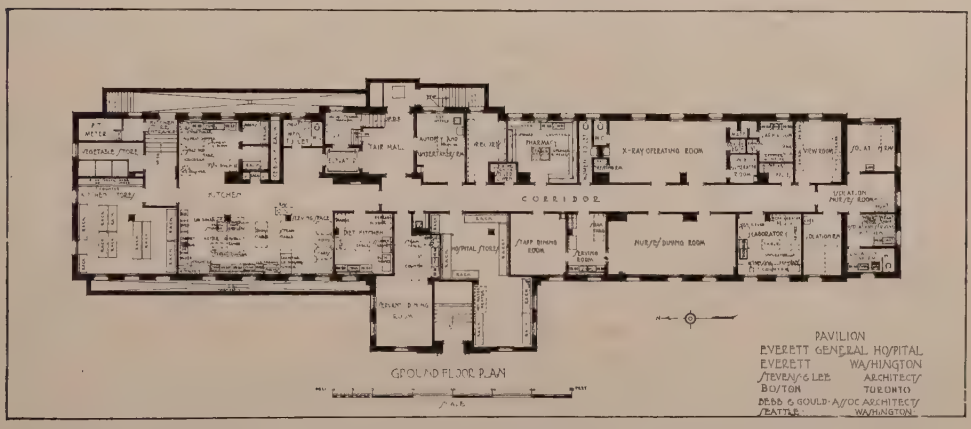



FIG. 134. GROUND FLOOR PLAN, EVERETT GENERAL HOSPITAL, EVERETT, WASH.

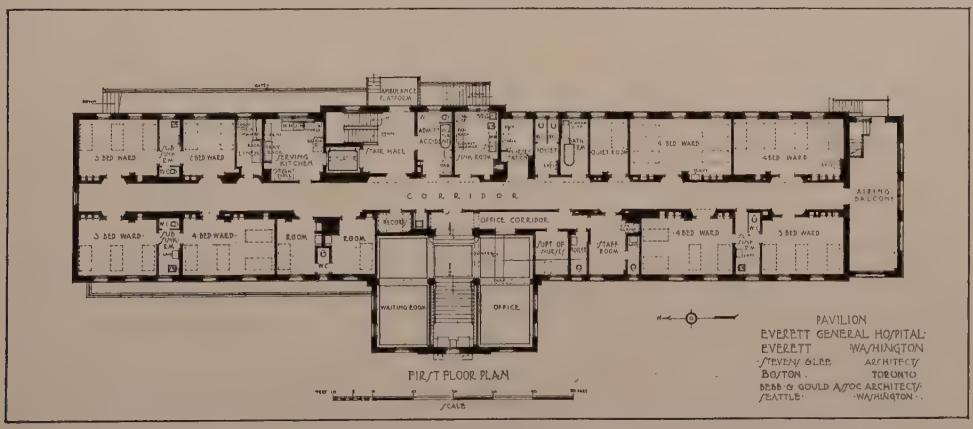



FIG. 135. FIRST FLOOR, EVERETT GENERAL HOSPITAL, EVERETT, WASH.

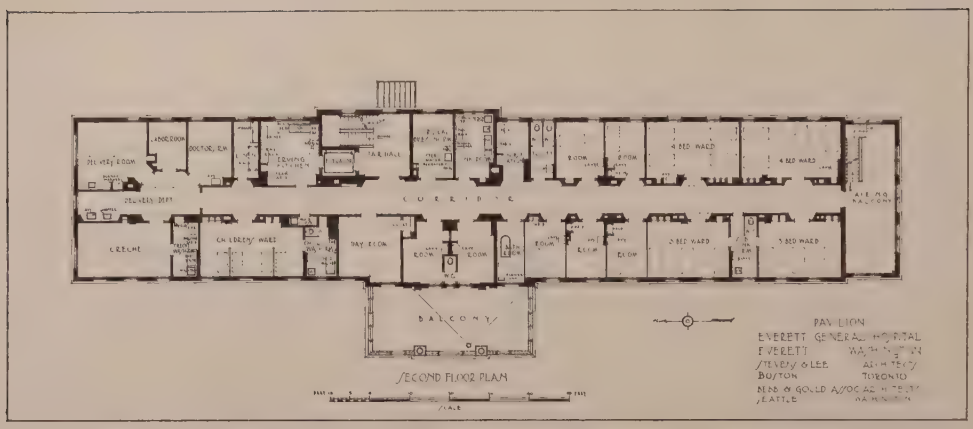



FIG. 136. SECOND FLOOR, EVERETT GENERAL HOSPITAL, EVERETT, WASH.

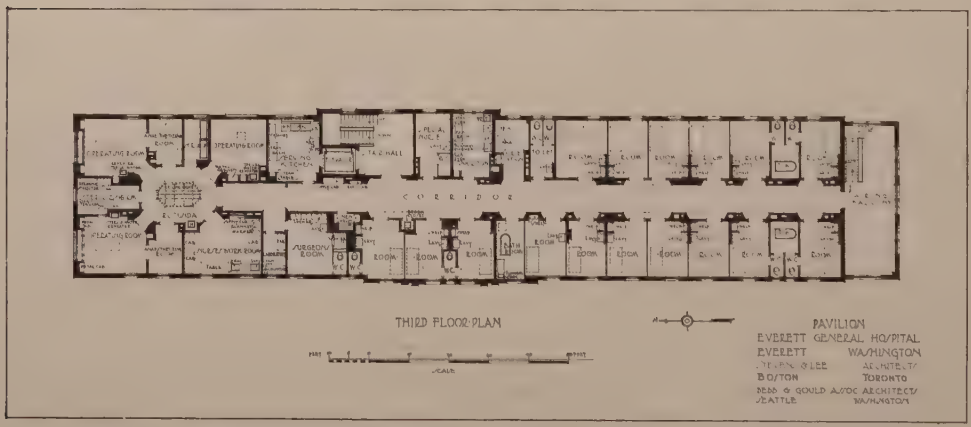



FIG. 137. THIRD FLOOR, EVERETT GENERAL HOSPITAL, EVERETT, WASH.
Stevens & Lee, Boston, Architects; Bebb & Gould, Seattle, Wash., Architects Associated

with toilets, some with lavatories only. A room has been provided for special nurses. The operating department is here, well shut off from patients; it comprehends three operating rooms, and all accessories, compactly placed. Near by is a laboratory for emergency examinations.

The Lawrence Memorial Hospital, Medford, Massachusetts, (Figs, 138-141), is a T-shaped building. The ground floor is occupied by the kitchens, dining-rooms, laboratory, X-ray, and a complete ward unit. The entrance is on the first floor, into a dignified memorial hall, near which are the superintendent's offices and quarters, public office, staff room, etc, The elevator and stairs are shut off to minimize noise; the sub sink rooms between the wards at the front of the building avoid conspicuous nursing procedures in view of incoming patients or visitors.

FIG. 138

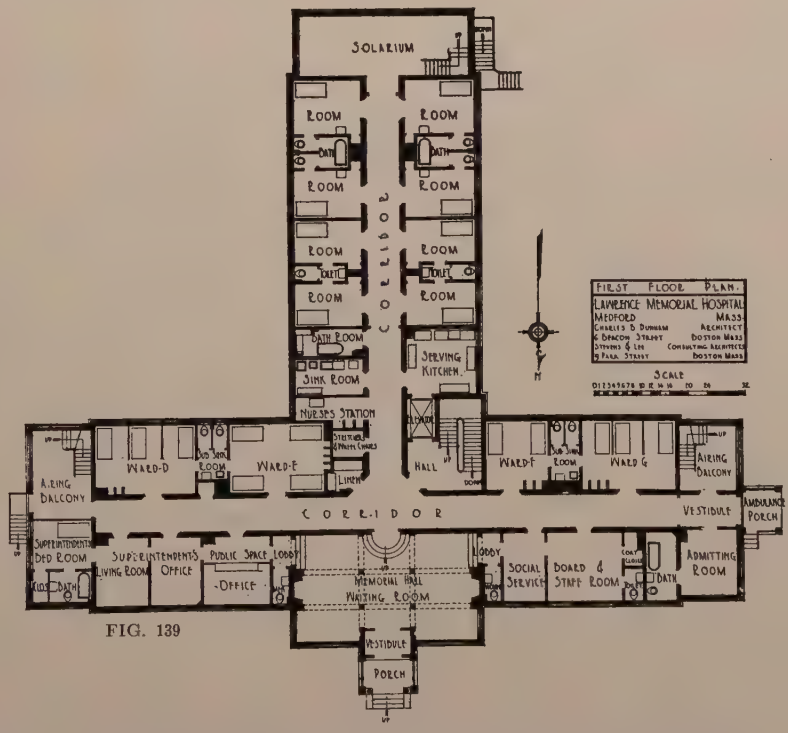



FIG. 139

PLANS OF LAWRENCE MEMORIAL HOSPITAL, MEDFORD, MASS.
Charles B. Dunham, Architect; Stevens & Lee, Consulting Architects

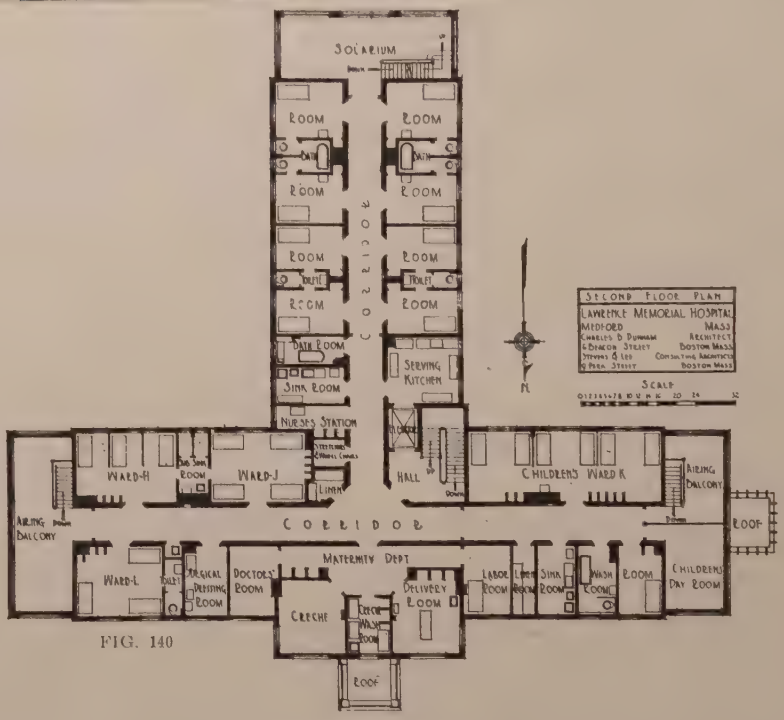



FIG. 140

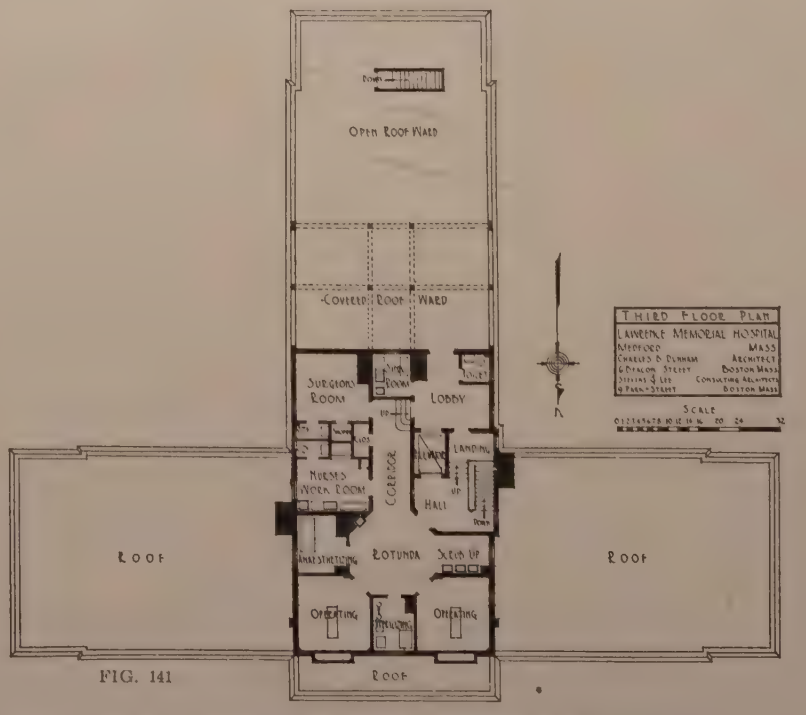
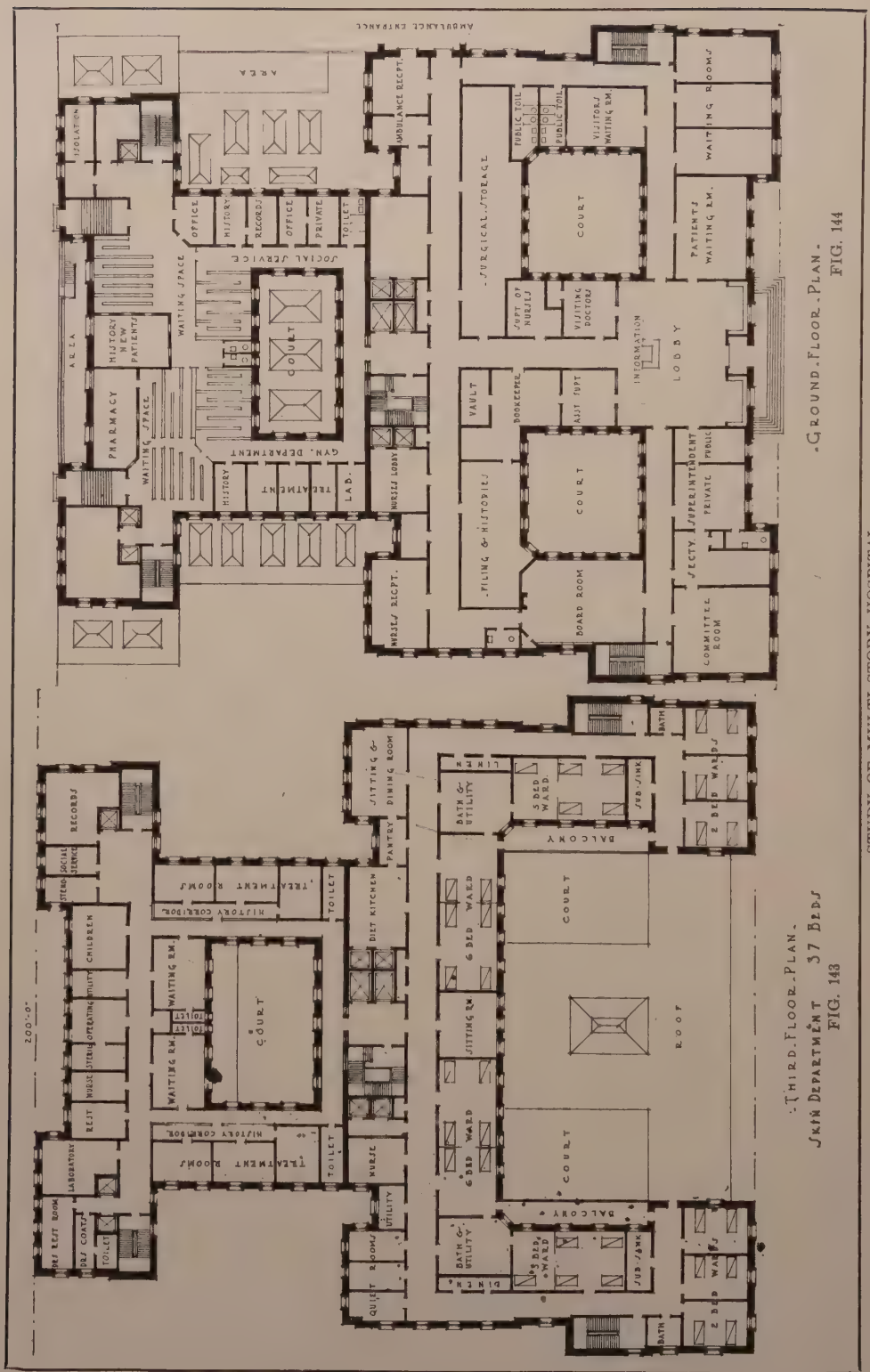



FIG. 141

PLANS OF LAWRENCE MEMORIAL HOSPITAL, MEDFORD, MASS.
Charles B. Dunham, Architect; Stevens & Lee, Consulting Architects

FIG. 142. EXTERIOR STUDY OF MULTI-STORY HOSPITAL
Charles Butler and Stevens & Lee, Architects




THIRD FLOOR PLAN.
SKIN DEPARTMENT 37 BEDS
FIG. 143

GROUND FLOOR PLAN.
FIG. 144

STUDY OF MULTI-STORY HOSPITAL
Charles Butler and Stevens & Lee, Architects

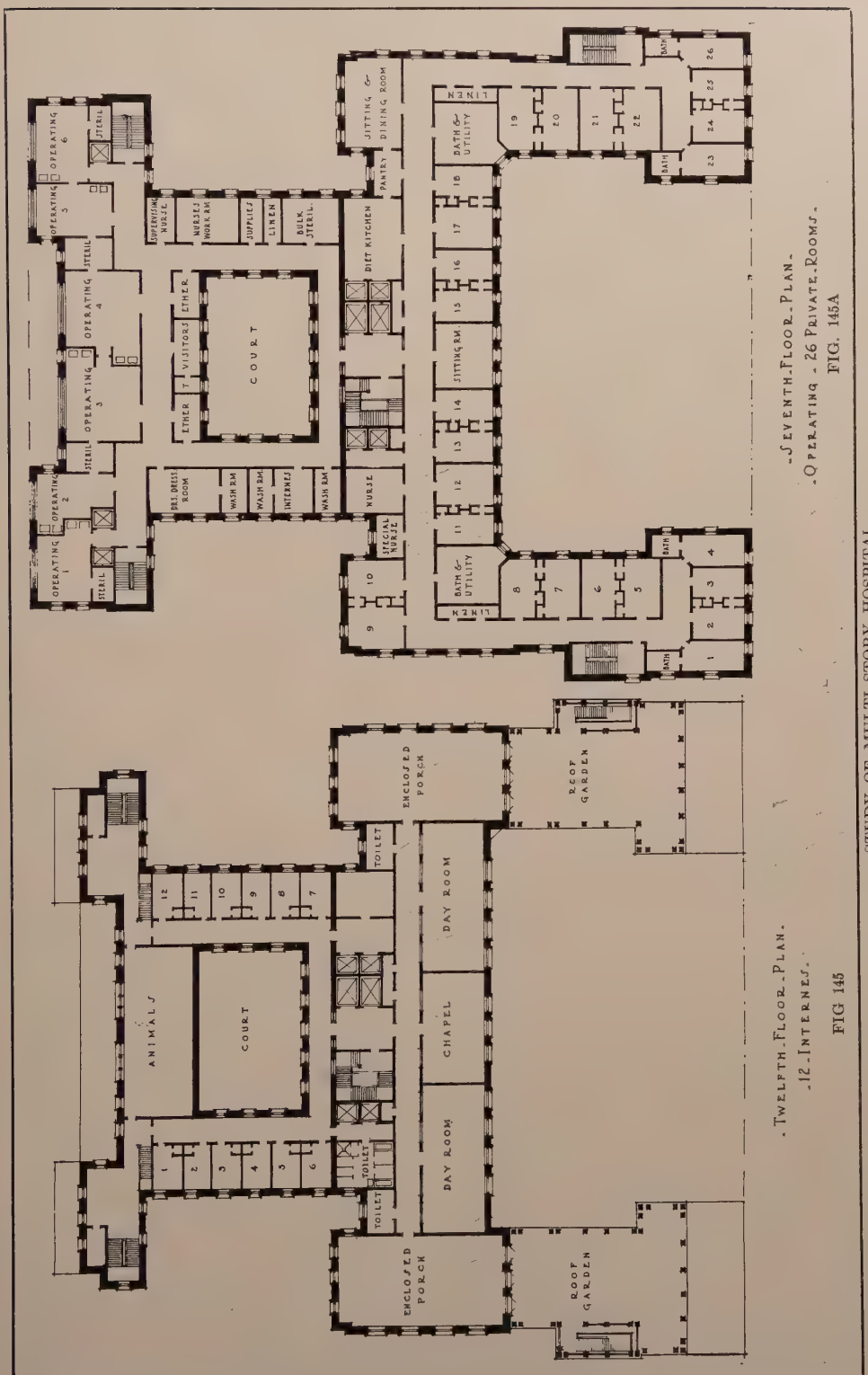
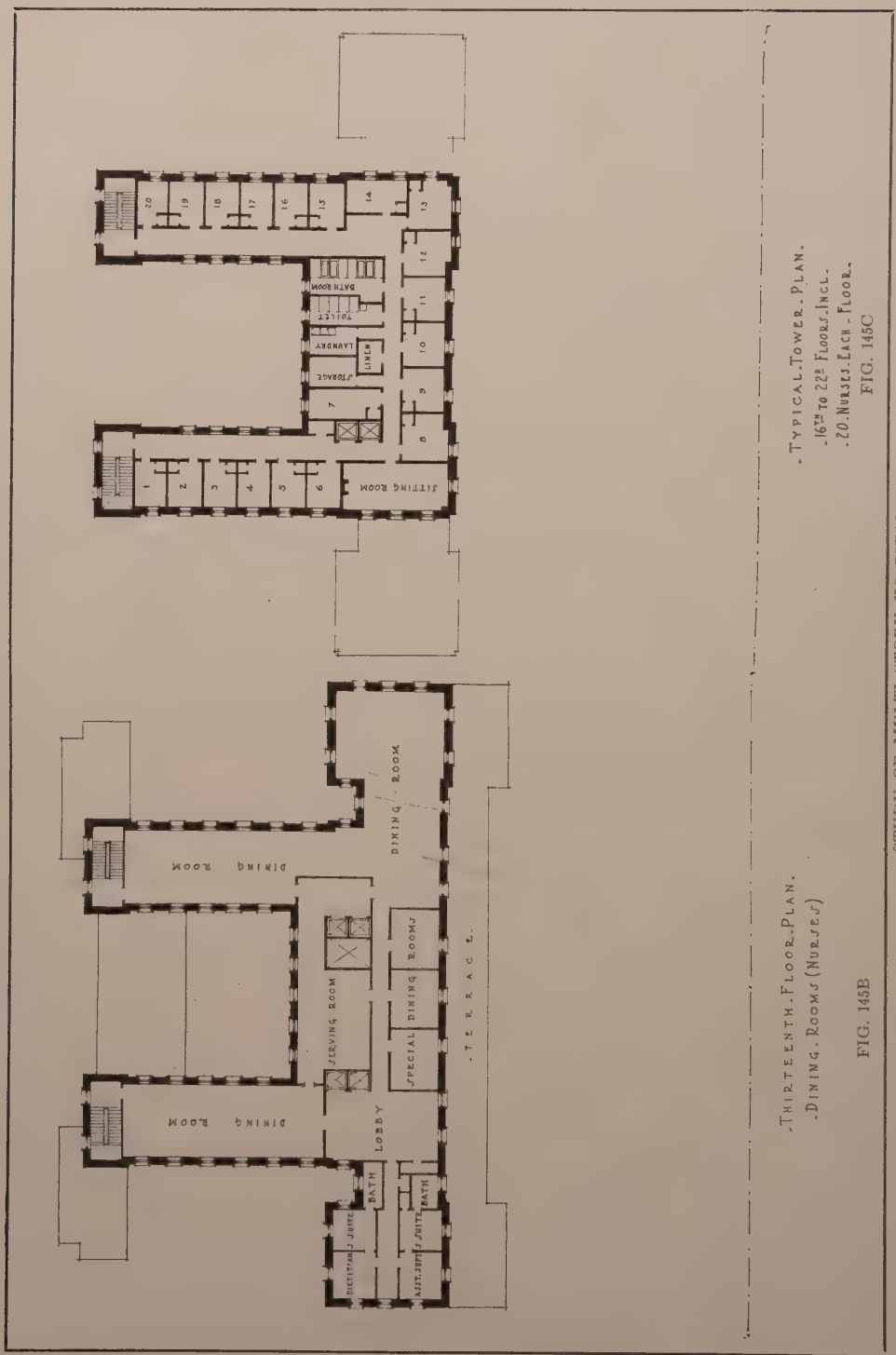



FIG 145

STUDY OF MULTI-STORY HOSPITAL
Charles Butler and Stevens & Lee, Architects




. THIRTEENTH FLOOR PLAN.
. DINING ROOMS (NURSES)

. TYPICAL TOWER PLAN.
. 16TH TO 22D FLOORS INCL.
. 20 NURSES EACH FLOOR.

FIG. 145B

FIG. 145C

STUDY OF MULTI-STORY HOSPITAL
Charles Butler and Stevens & Lee, Architects

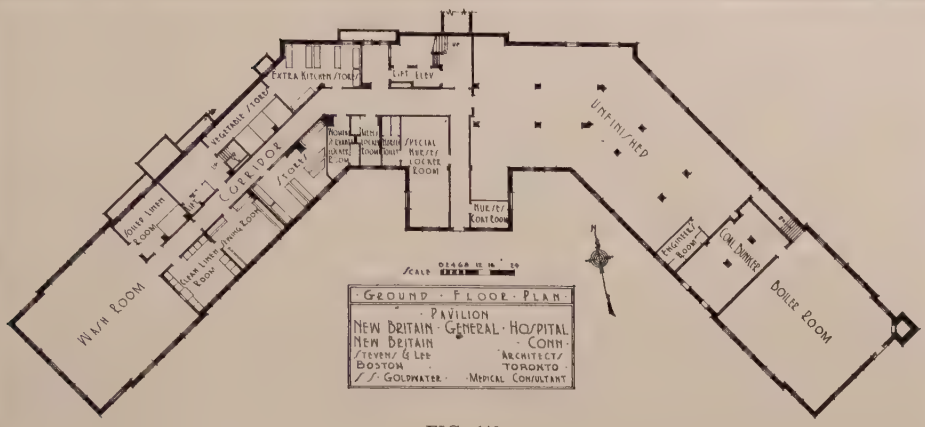



FIG. 146

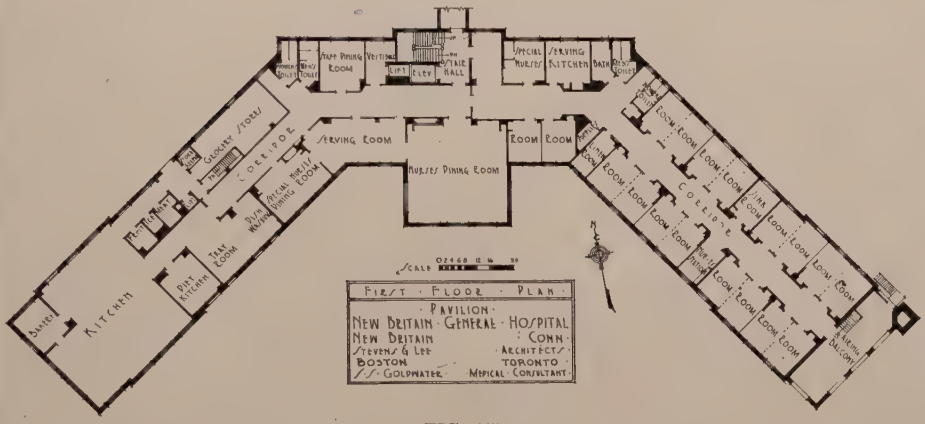



FIG. 147

FIG. 148

NEW BRITAIN GENERAL HOSPITAL, NEW BRITAIN, CONN.

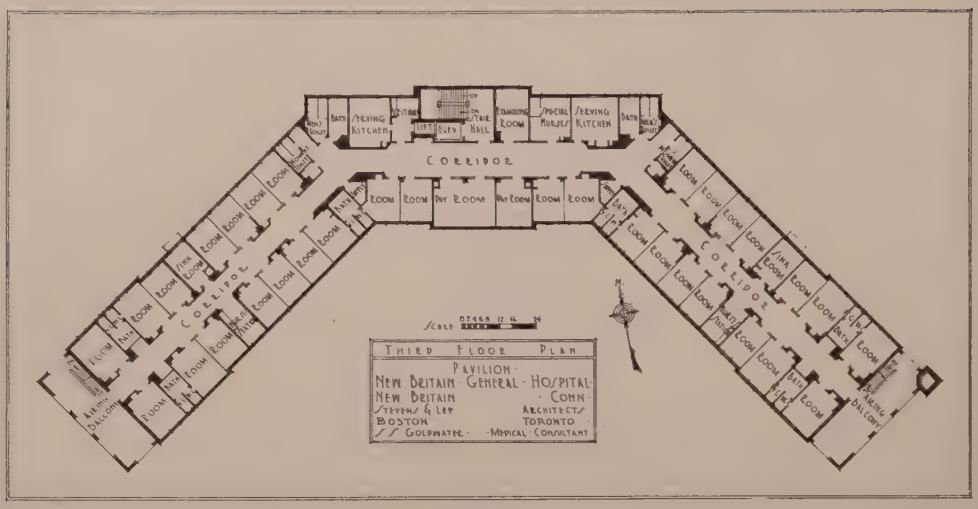



FIG. 149

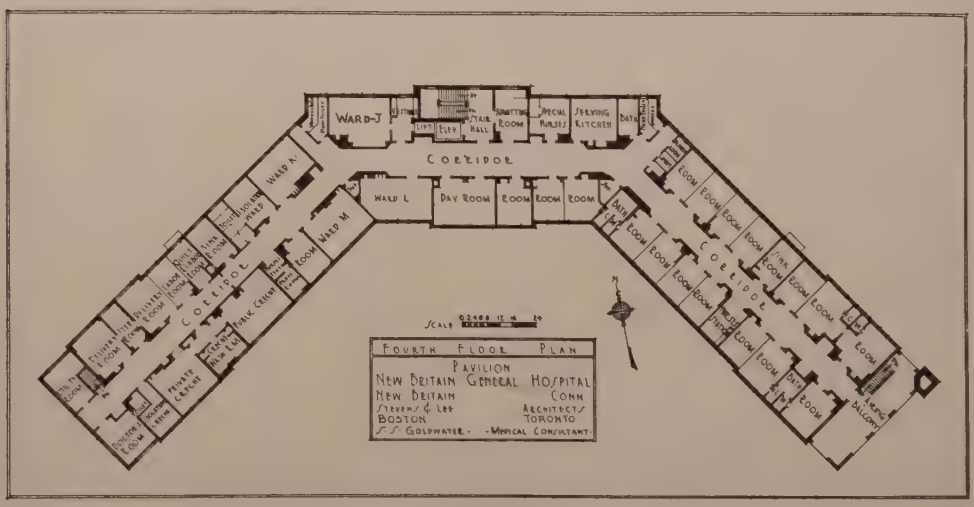



FIG. 150
NEW BRITAIN GENERAL HOSPITAL, NEW BRITAIN, CONN.

The second floor contains a maternity department, well isolated yet near by, small wards, one specially planned for children, and ample airing balconies. The third floor is a complete operating department, grouped around a central rotunda. Special features are the cubicle wards, with small doors in the dividing partitions, intercommunicating toilets with special devices for bed-pan washing; and the small utility rooms off the first-floor wards.

With the crowded conditions of our city streets, the city hospital can no longer be a spread-out affair, and we must look to the air

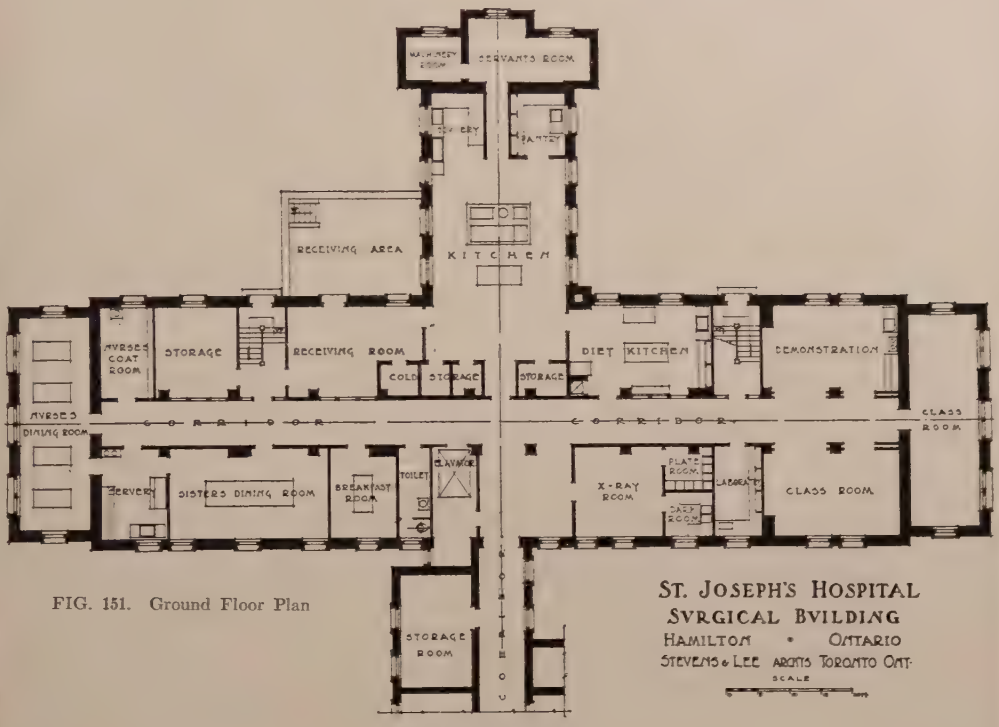



FIG. 151. Ground Floor Plan

FIG. 152. First Floor Plan

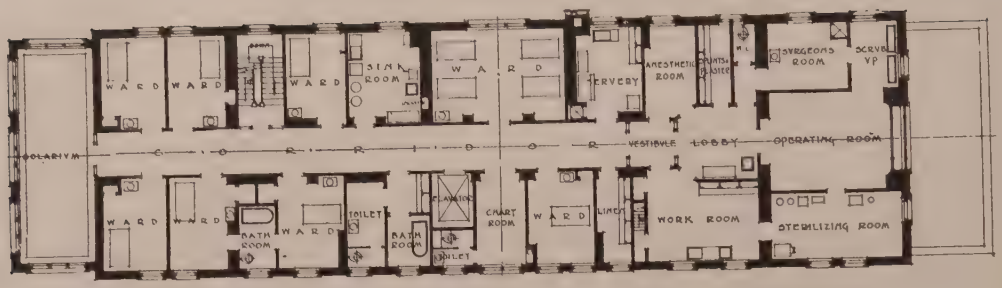



FIG. 153. SECOND FLOOR PLAN, ST. JOSEPH'S HOSPITAL, HAMILTON, ONT.
Stevens & Lee, Architects

FIG. 154. CHAPEL, ST. JOSEPH'S HOSPITAL, HAMILTON, ONT.
Stevens & Lee, Architects

FIG. 155. EXTERIOR, ST. JOSEPH'S HOSPITAL, HAMILTON, ONTARIO
Stevens & Lee, Architects

FIG. 156. WARD INTERIOR, ST. JOSEPH'S HOSPITAL AT HAMILTON, ONTARIO

rather than to land for accommodation. A corner site can often be secured so as to get light on three sides, but more often the only site available for a city hospital is one in the interior of a block. This is so in the case of the PROPOSED MULT-STORY HOSPITAL (Figs. 142-145C).

Designed for the interior of a city block, with available space of 200 feet on the street and a depth from one street to the other of 200 feet, the problem was to provide light and air for patients as well as for the attendants. This hospital is planned for twenty-three stories above the ground, besides various basements and sub-basements. The institution is to function not only as a hospital but as an out-patient and diagnostic clinic, and the upper eight stories as a complete nurses' home.

This building is naturally divided into two sections, the front or patients' section, and the rear or out-patients' section.

In the ground floor are planned all of the administrative offices, a generous entrance lobby with waiting rooms on either side, committee rooms and board rooms. In the rear portion will be the main entrances for the out-patient department.

The first three stories of the patients' portion are devoted to open wards, all facing on the court and street so that no patient will look directly onto the blank wall of another building. These wards consist of four or five beds at the most. Each floor is provided with a day room or sitting-room, also diet kitchen and other rooms necessary for service.

The out-patient department in the rear is carried up through the six stories and the different departments are reached by elevators on either side of the building.

In the seventh to tenth floors, in the front portion the space is divided into private rooms and suites. In the rear portion of the seventh floor is placed the operating department. This comprises six operating rooms, with the various work rooms, etc., to function with them.

Taking advantage of the zoning law of the City of New York which requires various setbacks on all high buildings, the twelfth floor affords ample room for roof gardens and solaria.

The entire space of the fourteenth to the twenty-second floors is devoted to nurses, provision being made for twenty nurses on each floor.

This plan shows merely one possibility for making adequate pro-

vision for the care of patients in a city block and still giving each individual patient the maximum amount of light and air.

The New Britain General Hospital, New Britain, Connecticut (Figs. 146-150), was planned to afford sunlight in every room at some time during the day. The ground floor contains laundry, store and locker rooms. On the first floor, at the left are the kitchen and dining-rooms, at the right private rooms, with nurses' station and sink room central, the serving kitchen near the elevator, and a room for special nurses. On the second floor are subdivided wards, and wards with auxiliary sink rooms, three balconies, two serving kitchens, a laboratory, day rooms—a separate one for children. The third floor contains private rooms, and has two day rooms. The fourth floor is for maternity work, has rooms and wards, the delivery rooms and creches being quite separate from the patients' rooms. A separate creche is provided for babies of private patients. Windows from corridors give view of the babies without entering the creche.

As a large part of the smaller hospitals today are being maintained by one or another religious society, it very often follows that the provision for a chapel must be incorporated into the plans of the institution. In the larger institutions, this is provided for by a separate building more or less isolated from the hospital group, but in the smaller institutions it is often considered advisable to have this chapel within the walls of the institution. A practical carrying out of this idea is shown in the plans of the St. Joseph's Hospital of Hamilton, Ontario (Figs. 151-155). In this surgical building, the ground floor was devoted, as in many other examples, to the kitchen, dining rooms, demonstration, classroom and Roentgen-ray department. On the first floor at either end of the pavilion are the wards for male and female, together with the service rooms, staircase, etc. In the crossing of the main corridor the chapel is located directly over the kitchen. The second story of this simple plan is devoted to private rooms and the operating department.

# CHAPTER V

## THE SURGICAL DEPARTMENT

IN American hospitals, the surgical or operating unit takes a greater variety of forms than does the ward unit. It is probable that no one can say with authority that this or that is the ideal arrangement for this important part of the hospital. We cannot take as our model any of the European operating building plans, since conditions there are vastly different. In the German government hospitals, one surgeon will do the majority of the operations and naturally will need but one or two rooms. In our own hospitals, with the large staffs in even those of only one hundred beds, it is not uncommon to find five or six operations going on at once.

In the Virchow at Berlin, with two thousand beds, there are four operating rooms; in the Munich-Schwabing, with one thousand beds, there is but one major operating room. In American hospitals we find at Massachusetts General Hospital, with four hundred beds, five operating rooms, besides those in the accident, orthopedic and private patients' departments; at Grace Hospital, Detroit, with two hundred fifty beds, four operating rooms; at Youngstown Hospital, Ohio, with one hundred fifty beds, six operating rooms for an active surgical and accident service. Such being the case, our construction must be governed largely by the methods of the local surgeons who are to work in any given building. Every year there come new methods in operating, affecting everything from the anesthesia of the patient to his recovery. A building planned to meet the requirements of today may therefore, when finished eighteen months hence, be found lacking in some essential detail. Thus it is that the up-to-the-minute operating unit is well-nigh impossible to obtain.

The operating department should, where possible, be isolated. A separate building is the ideal arrangement. Where this is not possible, the upper story (if there is elevator service) should be used and the department well separated from other rooms.

If the operating department is in a separate building, there should be an admitting room at the ambulance entrance, closely connected with the accident room, which should have good north light. These rooms should not connect with anything except the corridor. This accident room can also be used for septic cases.

The day of the amphitheatre in the modern hospital, as an operating unit for teaching, seems to have gone. While the amphitheatre is used, of course, for teaching in clinics and lectures, the majority of surgeons have come to the conclusion that in order to gain an intimate knowledge of live tissue the student must be very close to the patient under operation, and smaller and more numerous classes are formed.

For the ordinary operating room an *area* of 300 square feet, or a room about 16 by 20 feet, will very well suffice. All the actual work is concentrated about the operating table, and any space beyond that needed for the surgeons' and nurses' work and for the

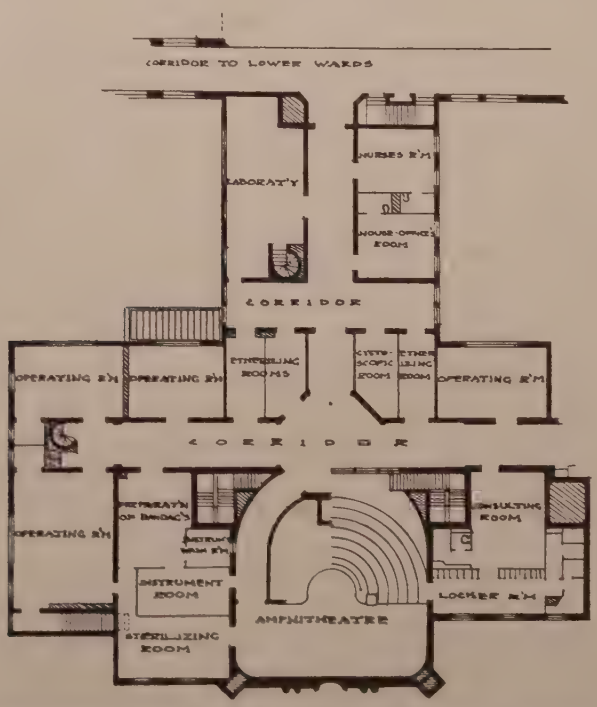



FIG. 157. OPERATING DEPARTMENT, MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASS.
Wheelwright & Haven, Architects

necessary equipment is more or less wasted. If observation stands or balconies are used, the area of the operating room should be increased to accommodate them. (See the Geisinger operating building, Fig. 65.)

The major operating room should have no plumbing or other attached fixtures, except perhaps a flushing floor drain and a sterile water outlet. A small electric instrument sterilizer may be thought

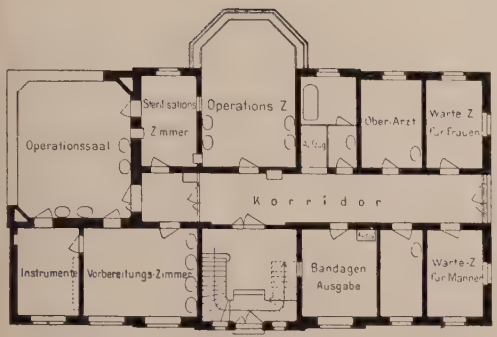



FIG. 158. OPERATING UNIT, ST. GEORG HOSPITAL, HAMBURG, GERMANY

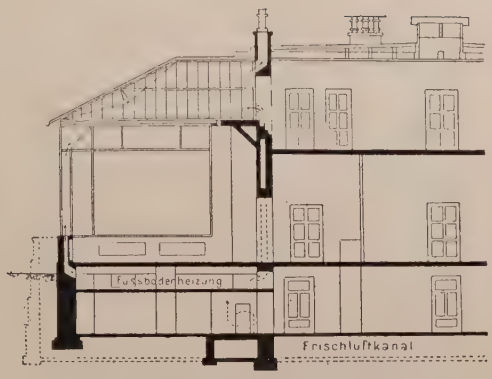



FIG. 159. OPERATING UNIT SECTION OF ST. GEORG HOSPITAL, HAMBURG, GERMANY

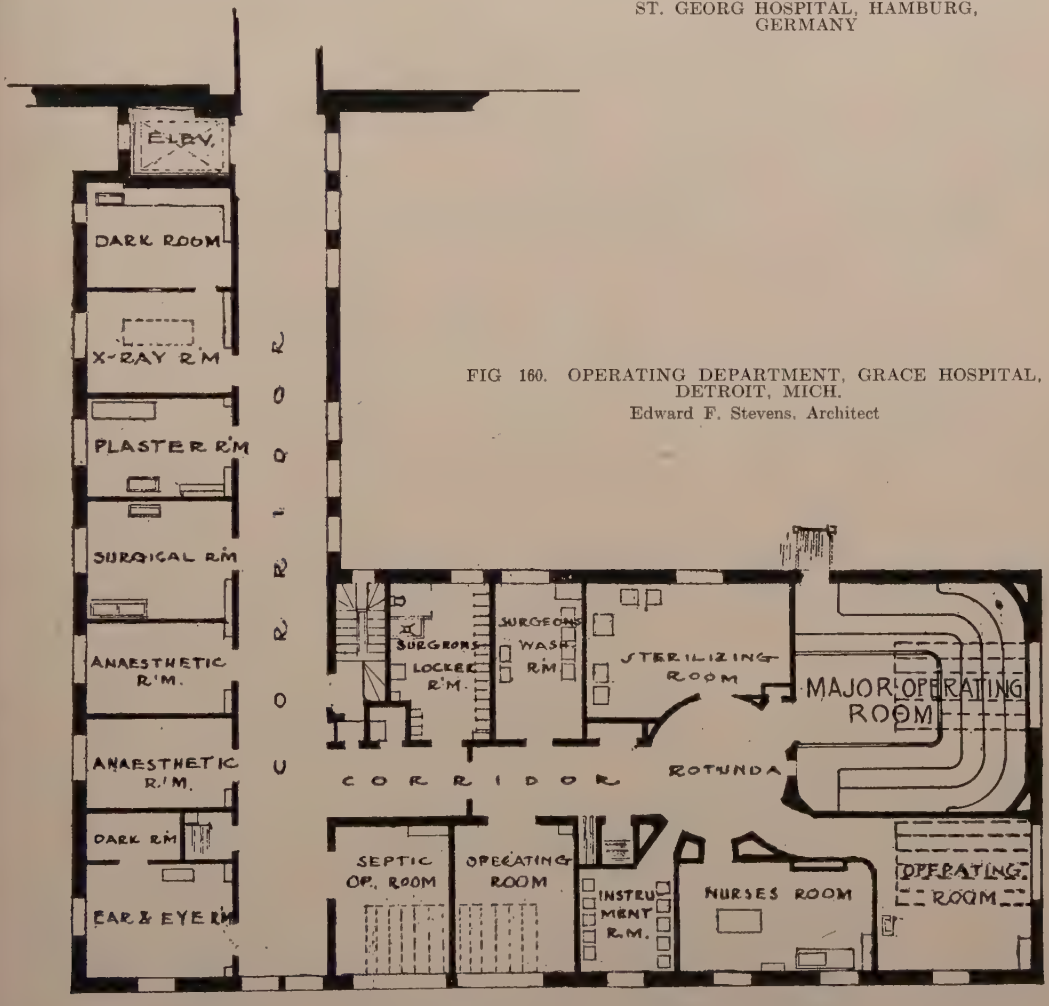



FIG 160. OPERATING DEPARTMENT, GRACE HOSPITAL, DETROIT, MICH.
Edward F. Stevens, Architect

1·PLAN·OF·THIRD·FLOOR·

FIG. 161. OPERATING BUILDING, YOUNGSTOWN HOSPITAL, YOUNGSTOWN, OHIO
Edward F. Stevens, Architect; Stanley & Scheibel, Associate Architects

desirable, but with the sterilizing room close at hand this is not necessary.

The heating of the operating room should be sufficient for any desired temperature within reason. Fresh air should be introduced to make the room comfortable to work in. This can be accomplished in various ways—by the plenum system, where the air is heated and blown in by fans; by gravity, with screens to prevent air from being fouled by dust; and by direct-indirect, with proper air inlets carefully screened. There can be no objection to direct heat, provided the heating units are readily accessible for cleaning, and provided fresh air can in some way be introduced. But the rooms used for operating, sterilizing, and anesthetizing must be well ventilated always. (See Chapter XVIII, "Heating and Ventilation.")

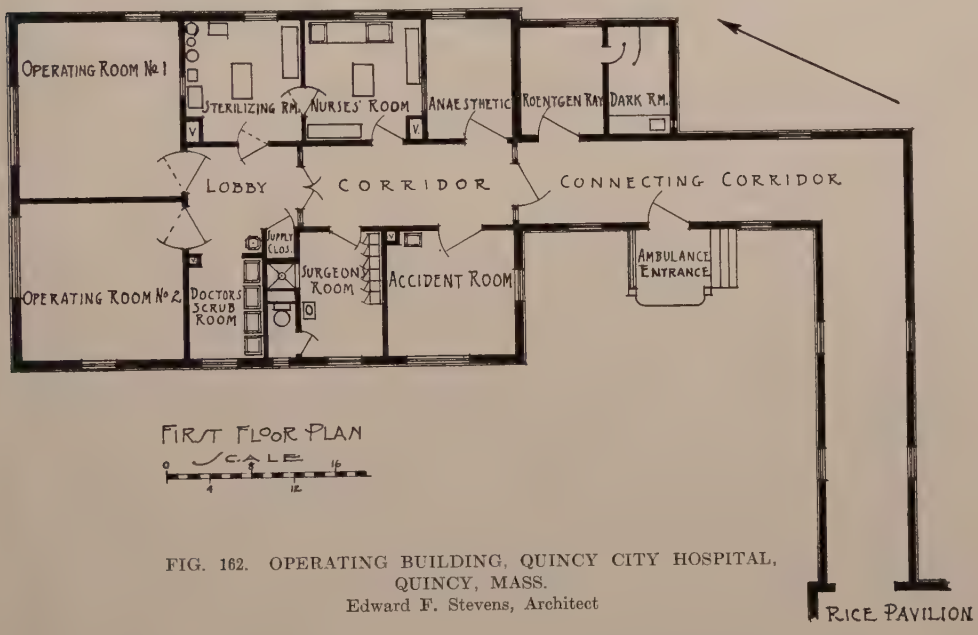



FIG. 162. OPERATING BUILDING, QUINCY CITY HOSPITAL, QUINCY, MASS.
Edward F. Stevens, Architect

The lighting of the operating room needs careful study, both for day and for night. For the day, large vertical windows and skylight, facing toward the north or as near the north as possible, are best. By carrying the vertical windows sufficiently high, practically the same results without skylights are obtained so far as light is concerned—e. g., Macon, Cable Memorial and Williams Hospitals. The glazing, in cold climates, should be double, or with a glass screen, as at the Jefferson in Philadelphia, the Bridgeport at Bridgeport, the

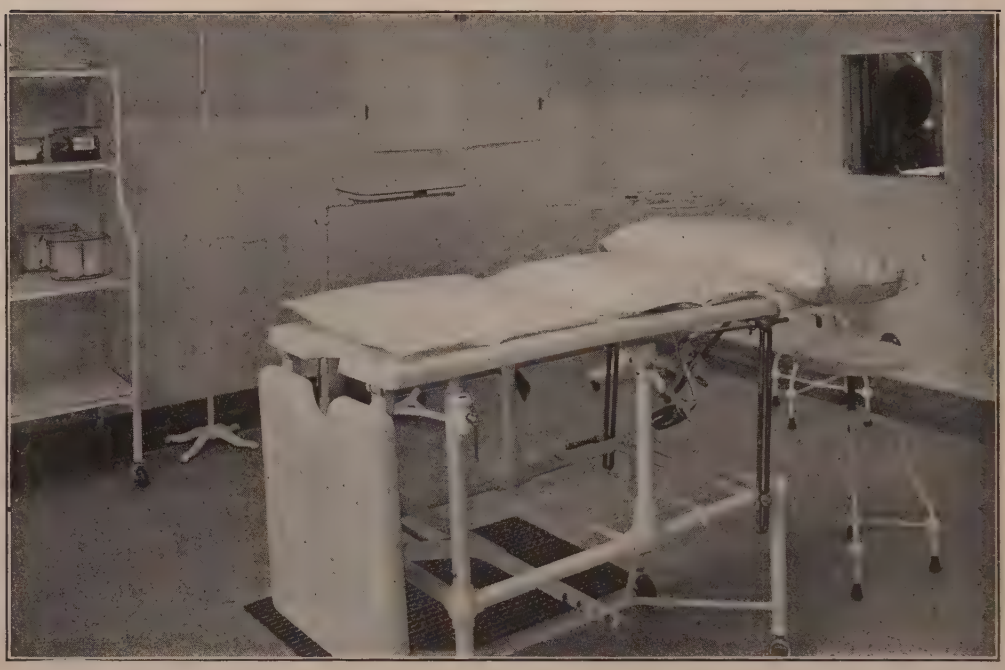


FIG. 163. OPERATING ROOM, QUINCY CITY HOSPITAL, QUINCY, MASS., SHOWING GLASS SLIDE OVER INSTRUMENT STERILIZER

FIG. 164. OPERATING ROOM, OHIO VALLEY GENERAL HOSPITAL, WHEELING, W. VA.
Edward F. Stevens, Architect

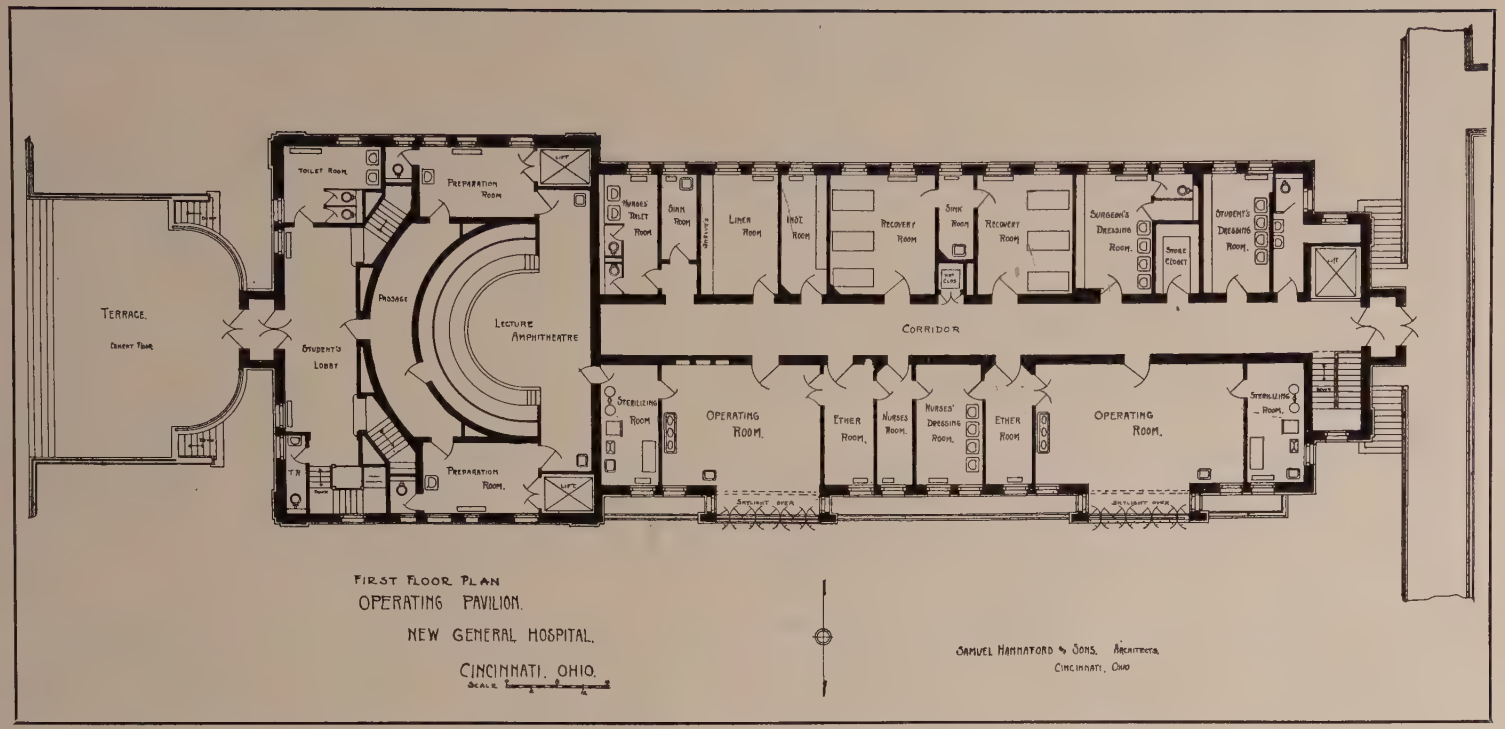



FIG. 165. FIRST FLOOR, OPERATING PAVILION, CINCINNATI GENERAL HOSPITAL, CINCINNATI, OHIO
Samuel Hannaford & Sons, Architects

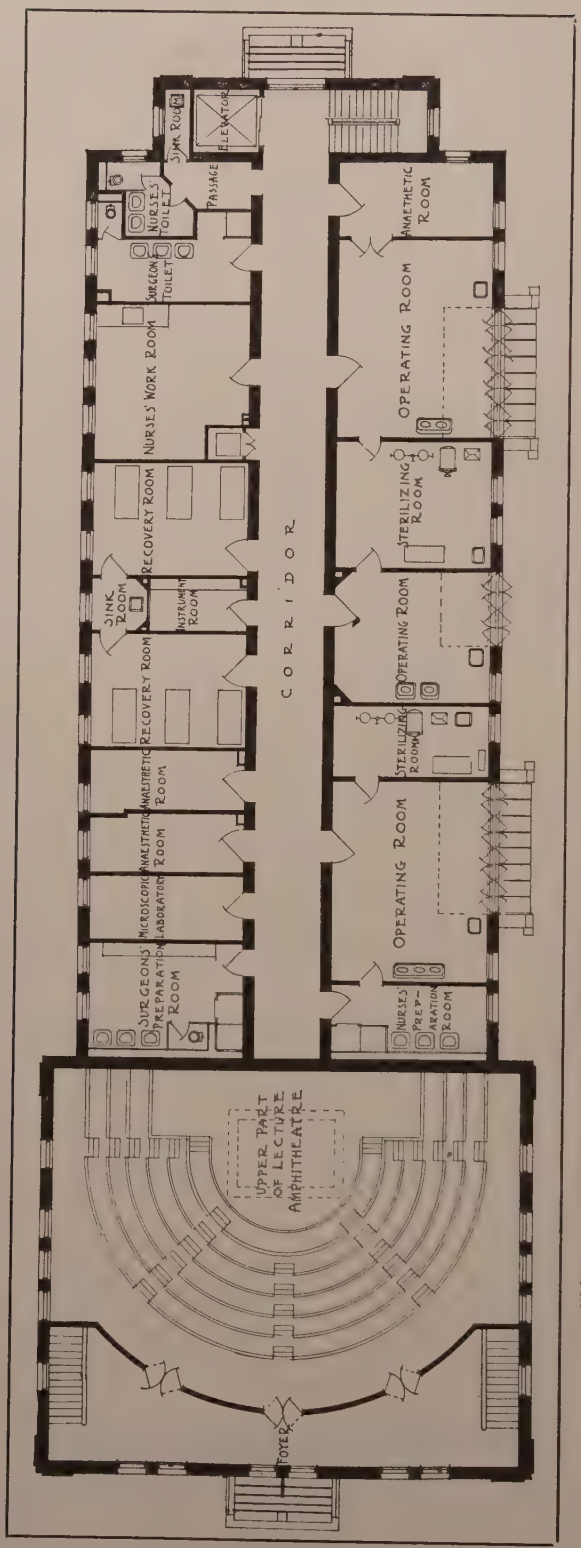



FIG. 166. SECOND FLOOR, OPERATING PAVILION, CINCINNATI GENERAL HOSPITAL, CINCINNATI, OHIO
Samuel Hannaford & Sons, Architects

FIG. 167. THE OPERATING ROOM, BISPEBJERG HOSPITAL, COPENHAGEN, DENMARK

Royal Victoria at Montreal, etc. The skylight windows may have rolling shades between the two panes of glass in case the light is too strong.

There is much to be said in regard to artificial lighting. The crane light has been used successfully, having the advantage of a direct and powerful light when needed and of being swung away easily when not wanted. (See Artificial Lighting, Chapter XIX.)

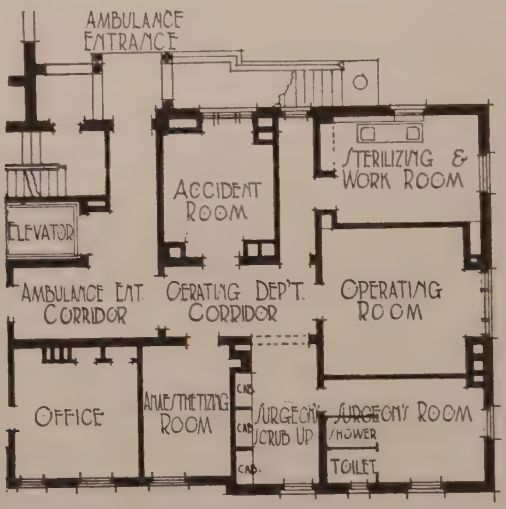
Reflected lights from numerous fixtures, either with direct reflectors or diffused from the ceiling, have been very successful.

Daylight effect is very desirable in the operating room. There are different lamps and combinations with occasional improvements. The best of today appears to be some form of concentrated light which will give a shadowless illumination.

One can hardly name the best floor for an operating room. There are many good materials, such as non-absorbent marble, vitreous tile, terrazzo, and even cement if treated with a non-dusting preparation.

The walls of the operating room should either be lined with marble or tile, or finished in hard plaster and thoroughly enamelled. It must

be possible to scrub thoroughly or spray with water or steam the entire surface of the walls and floor. To this end a floor drain of proper construction should be supplied. (See Chapter XVIII, "Plumbing.")




Courtesy of The Architectural Forum

FIG. 168. OPERATING DEPARTMENT, MARY LANE HOSPITAL, WARE, MASS.
Edward F. Stevens, Architect

It has been found that a clear white tile on floor and walls is too glaring in the intense light of the operating rooms; and gray, buff, and even green have been used with success. Gray Tennessee marble is very satisfactory. Some surgeons have insisted upon having the lower portion of the walls a dark shade of gray, green or even black, the sheets and towels which cover the patient and the gowns of doctors and nurses being of a similar color. It is the writer's usual practice to make the upper portion of the walls a light buff, not far from the color of manila paper, and the lower portion a little darker; this has proved acceptable to some of the leading surgeons. One authority recommends a light bluish green as giving a maximum of illumination with a minimum of eye-fatigue.

Next in importance to the operating room is the sterilizing room. This need not be large, but should be specially ventilated; all exhaust steam pipes should be extended into the open air; and if a hood can be placed over the sterilizer, it should be done. It is advisable to place the water sterilizers or still at an elevation, so that the sterile water may flow to each operating room and, by the use of reheaters,

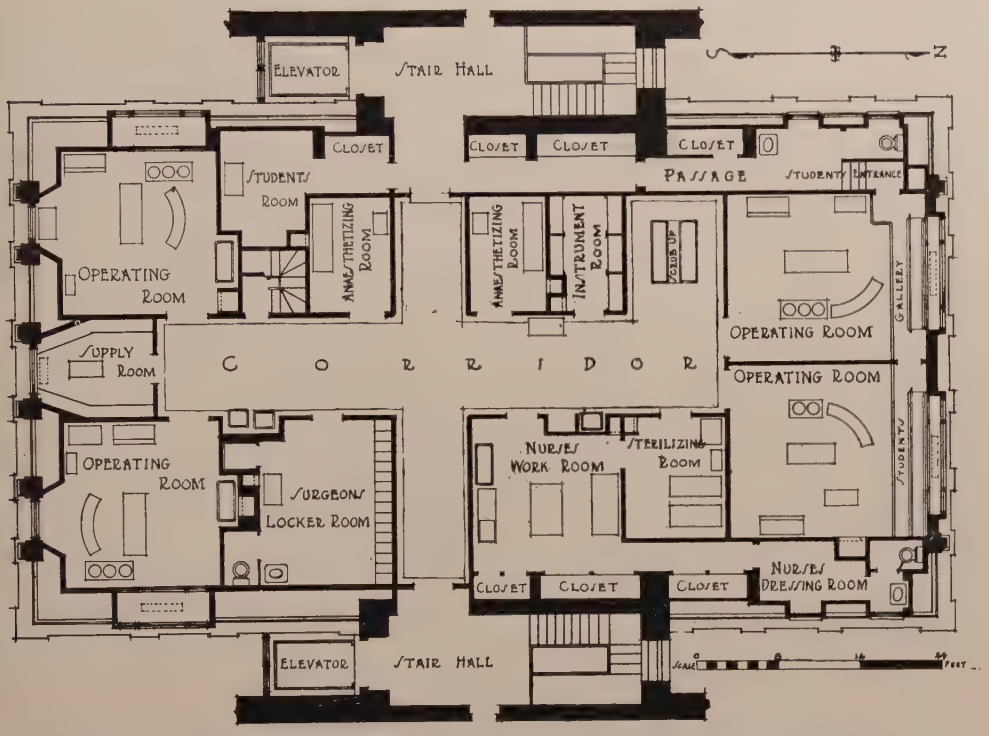



FIG. 169. OPERATING DEPARTMENT, NEW YORK CITY HOSPITAL, NEW YORK, N. Y.
Charles B. Meyers, New York, and Edward F. Stevens, Boston, Architects

be heated by steam or electricity. Such reheaters should be provided with elbow control valve and the discharge nozzle protected from contact by a metal or glass hood. A proper receptacle, like a porcelain sink, properly trapped, should be placed under the reheater. (See Fig. 631A, Chapter XX.)

The nurses' workroom should be large enough for the corps of nurses needed, should be provided with tables for making up dressings, with sinks, slabs for cleaning instruments, special scrub-up bowls for the clean nurses, cabinets for sterile and unsterile dressings, etc.

The small laboratory for quick diagnoses is considered a necessary part of the operating suite. It should be well provided with apparatus for making rapid microscopic examinations of tissue while the patient is still on the table.

There should be a surgeons' room or rooms, of sufficient size, supplied with a locker for each surgeon, comfortable furniture, shower bath and toilet. The instrument room may have a locker or compartment for each surgeon's instruments. Anaesthetizing rooms, well ventilated, should be sufficiently screened from the operating corridor.

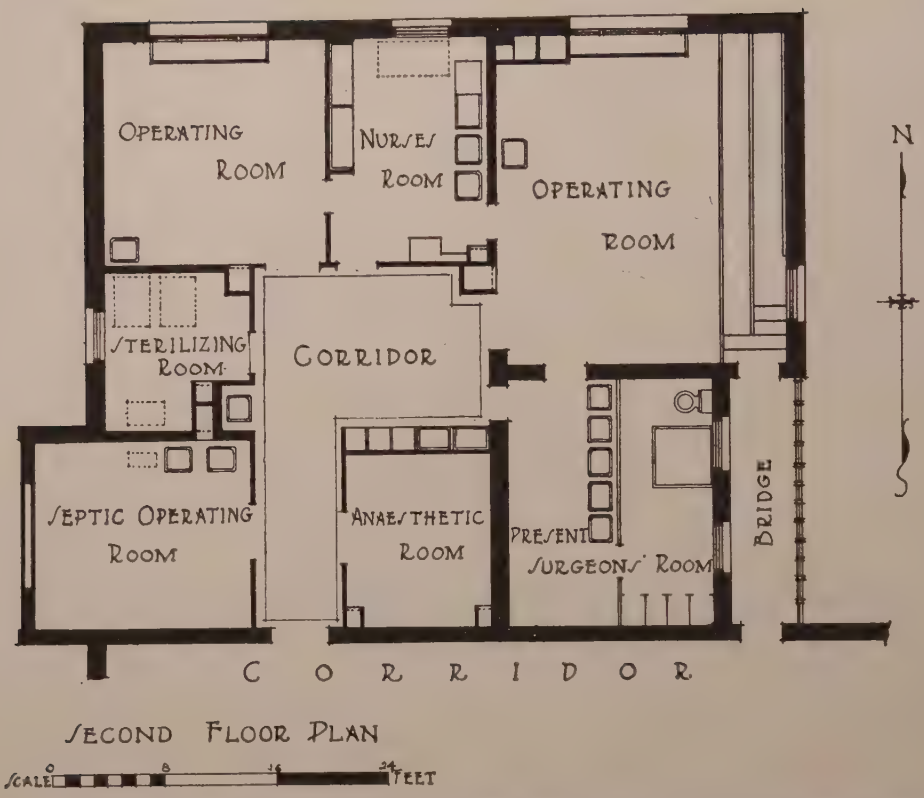



FIG. 170. OPERATING DEPARTMENT, BRIDGEPORT HOSPITAL, BRIDGEPORT, CONN.
Edward F. Stevens, Architect

yet near the operating rooms, and should have doors of ample width to admit a bed, with jambs and doors protected by metal.

The scrub-up sinks should be either in the corridor or in an open alcove without doors near the operating room where there will be plenty of room for all to work without interference, and with plenty of shelf room for soap, brushes, etc.

The details of finish and equipment, the plumbing and heating of the operating suite will be taken up in later chapters.

The operating department of the St. Georg Hospital (Fig. 158) at Hamburg is one of the most carefully worked out, so far as hygienic detail is concerned. Strict attention is given to the heating and ventilation (Fig. 159); the air is washed and filtered before entering the room, and the direct heating units are entirely outside the walls. The equipment is most carefully designed.

In the operating department of Grace Hospital, Detroit (Fig. 160), there are three rooms for clean surgery, besides the septic,

FIG. 171. BUILT-IN CASES, OPERATING DEPARTMENT, BRIDGEPORT HOSPITAL, BRIDGEPORT, CONN.

FIG. 172. MAJOR OPERATING ROOM, BRIDGEPORT HOSPITAL, BRIDGEPORT, CONN.
Edward F. Stevens, Architect

FIG. 173. OPERATING ROOM, BRIDGEPORT HOSPITAL, BRIDGEPORT, CONN.

surgical dressing, and plaster rooms. The surgeons' locker and dressing rooms are outside the clean portion of the department. Here the room for scrubbing up is not connected with the locker room. There is a large sterilizing room and a larger room for the nurses' work of preparation; also an instrument room where each surgeon has his own compartment in the instrument case, etc.

The operating building of the YOUNGSTOWN HOSPITAL (Fig. 161), Youngstown, Ohio, is two stories in height, and is divided into two sections—the accident and the operating proper. The accident department, on the ground floor, gives access for ambulance patients; the elevator reaching the first floor level. On the ground floor are the receiving and waiting rooms, the two accident rooms, laboratories, morgue and store rooms. On the first floor are the operating rooms, with two anesthetizing rooms, which are placed in the center of the building, with skylights, and are entered either from the main corridor or from the operating corridor. This makes it unnecessary for the patient to enter the operating corridor until anesthetized. The three clean operating rooms open from a ten-foot corridor, in which

FIG. 173A. OPERATING ROOM, DR. WILLIAMS' PRIVATE SANATORIUM, MACON, GA.

are the surgeons' scrub-up bowls, so placed that six men may scrub at once. A septic operating room is provided, a large sterilizing room, a large work room for nurses, instrument room and a small laboratory.

Sterile water is brought from a central apparatus to each operating and accident room, and there heated locally by electricity.

The Quincy City Hospital (Figs. 162 and 163), Quincy, Massachusetts, is a small institution with a capacity for fifty beds, but its operating department is in a separate building. In this, all the essentials have been provided. The accident and Roentgen-ray rooms and surgeons' room are removed from the clean corridor.

At the Ohio Valley General Hospital one wing of the fifth floor is set apart for the operating department, with one septic and two clean operating rooms (Fig. 110). The scrub-up basins are placed in the center of an open cross corridor, accessible from all sides. Sterilizing room, nurses' work room, surgeons' and anesthetizing rooms are placed conveniently for service. Distilled water from

FIG. 174. MAJOR OPERATING ROOM, BARRE CITY HOSPITAL, BARRE, VT.
Edward F. Stevens, Architect

FIG. 174A. OPERATING ROOM, HOSPITAL OF ST. JOHN AND ELIZABETH, LONDON, ENG.
Young & Hall, F. R. I. B. A., Architects

a supply tank in the tower furnishes sterile water for the operating, accident, maternity, and laboratory departments.

The operating pavilion of the CINCINNATI GENERAL HOSPITAL (Figs. 165-166) is most complete, each operating unit having its own anesthetic room adjoining and recovery room close at hand. The necessary nurses' work rooms, dressing, instrument, and laboratory rooms are provided.

The lecture amphitheatre, while in the same building, is not directly connected, but is reached through the lower level and approached by two elevators and staircases.

In the private patients' building of the BUFFALO GENERAL HOSPITAL, Buffalo, New York (Fig. 59), there are two major operating rooms, each with an anesthetizing room adjoining; the sterilizing room is between them. The nurses' work room and a minor or eye operating room open off the same corridor, in the ample space of which are the surgeons' scrub-up sinks. A plaster room, the surgeons' room and the nurses' locker room open from an adjacent corridor. The instrument cabinets are built into the construction.

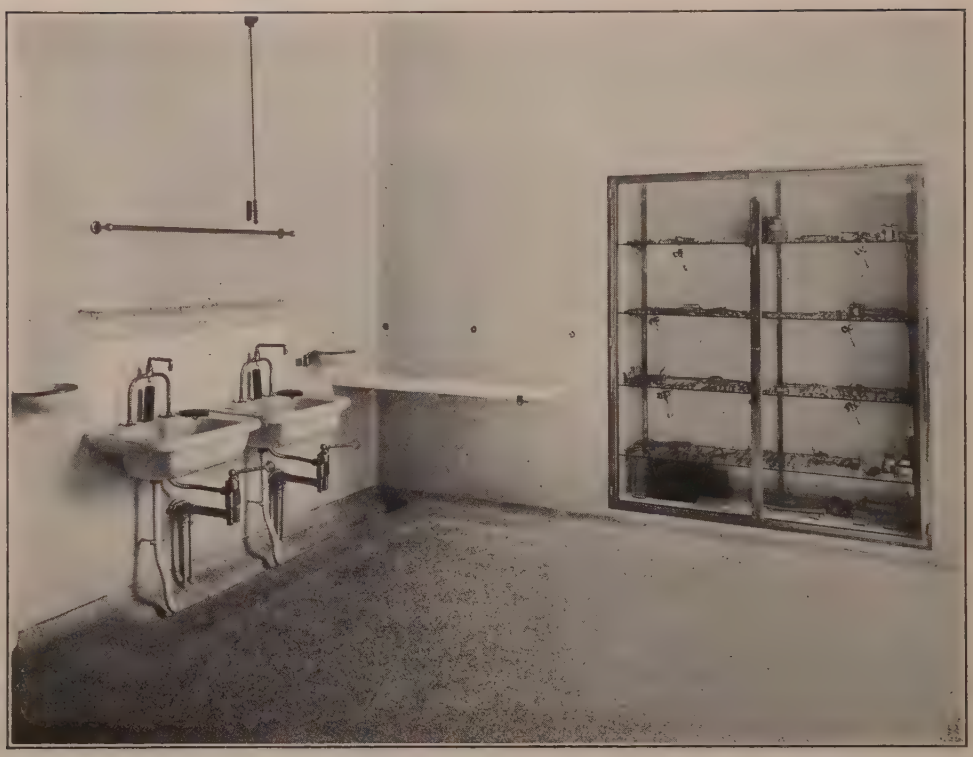


FIG. 174B. Operating Room Showing Instrument Case and Surgeon's Scrub-up
HOSPITAL OF ST. JOHN AND ELIZABETH, LONDON, ENG.
Young & Hall, F. R. I. B. A., Architects

In the operating building of the GEORGE F. GEISINGER MEMORIAL HOSPITAL, Danville, Pennsylvania (Fig. 65), the rooms are grouped about an octagonal rotunda, in the center of which is the surgeons' scrub-up, forming a decorative feature. The walls of the rotunda are of marble, with cases for the instruments set into niches on four sides. There are three operating rooms, one of which can be darkened for eye work. The observation stands in these rooms are approached from separate corridors, making it unnecessary for students or visitors to pass through the operating room. A window from this special corridor also permits observation from that point. Each operating room has its heating unit vestibuled between the inner and outer window sashes. In these same vestibules are refrigerating pipes for reducing the temperature in summer.

The sterilizing room for instruments and utensils opens directly into the two operating rooms; a separate sterilizing room for dressings is provided. Distilled water is piped to each operating room. There is a small laboratory and ample storage space for linen and supplies.

FIG. 174C. DRESSING STERILIZER AND STORAGE CABINETS, HOSPITAL OF ST. JOHN AND ELIZABETH, LONDON, ENG.

The admitting room for accident cases is located near this department.

It will be observed that doors have been dispensed with throughout the department wherever possible.

In the Ottawa Civic Hospital, Ottawa, Canada (Fig. 89), the surgical department occupies practically the whole of the sixth floor. There are four major operating rooms and one for eye work. The sterilizing room is in two sections, for facility of service; the instrument room is directly off the instrument sterilizing room. There is a separate room for plaster work, and a large work room. Special features are the separate dressing rooms for the house and attending staff, as well as the one for the nurses. There is a waiting room for the relatives of patients.

In the Notre Dame Hospital, Montreal, (Fig. 95), there are two major operating rooms with a sterilizing room between them, an eye operating room, and a plaster room. The scrub-up is in the rotunda, and around this rotunda centers the service. There are three anesthetizing rooms, near the elevator, opening on a special corridor.

FIG. 174D. STERILIZING ROOM, HOSPITAL OF ST. JOHN AND ELIZABETH, LONDON, ENG.
Young & Hall, F. R. I. B. A., Architects, London

The surgeons' room is at the left of the staircase; there is a large work room, ample storage space for made-up supplies, a dressing room for the nurses, and a small emergency laboratory.

In the Hamot Hospital, Erie, Pennsylvania (Fig. 56), nearly the whole of the top floor is devoted to the operating department. The two larger operating rooms are on their own corridor. The delivery room is situated here, also a room for plaster work. There is a sink room and serving kitchen next the roof garden, so that it may be used for the outdoor treatment of cases which require it.

The Mary Lane Hospital, Ware, Massachusetts, (Fig. 168), presents a compact and convenient arrangement for a small operating department.

Attention is called to the operating departments of the Everett General Hospital (Fig. 137), the Lawrence Memorial Hospital (Fig. 141), the Mason Hospital (Fig. 421), and the Soldiers and Sailors Memorial Hospital (Fig. 430). In all of these quick and convenient service was the chief consideration.

*Remodelled Operating Departments.* It is quite common, in modernizing an old hospital, for the provision for the operating department to be somewhat limited; and it is not an unusual thing for the attic story, which has been used as kitchen or servants' quarters, to be turned over to the architect to make into a modern operating department. Two or three examples of this may be helpful.

In the New York City Hospital (Fig. 169), Blackwell's Island, the dome of the old building, formerly used as a kitchen, was so reconstructed as to meet the needs of the surgeons. The structures of the roof trusses made the planning more difficult, and the spaces which would in an ordinary case be used as operating rooms were very conveniently turned into nurses' and students' locker rooms and entrance to students' gallery (in no sense an amphitheatre). Skylighting of all rooms was practically necessary. Four operating rooms are provided, only two of which could have the north exposure. Here again distilled water is made at an elevation, and conducted to the various rooms.

At the Bridgeport Hospital (Fig. 170) the case was slightly different. An old operating theatre, with a small addition, was turned into three modern operating rooms, with sterilizing, instrument and work rooms. Entrance for students to the major operating room was secured by a gallery from the main corridor.

Built-in cabinets (Fig. 171), distilled water reheaters, and specially designed equipment make this a very complete department.

# CHAPTER VI

## THE PHYSIOTHERAPY DEPARTMENT

MORE and more every year it is coming to be recognized that many diseases and ailments hitherto considered surgical or neglected altogether can now be alleviated without surgery and with little medicine, by means which are called "treatments." The so-called "bath" departments of European hospitals include not only baths of water, steam, hot air, electric light, gas ($CO_2$), mud or peat, sand, etc., but sun baths, ultra-violet ray treatments, X-ray treatments, many forms of mechano-therapy, inhaling and pneumatic chambers, etc. These have been gradually introduced into this country, and today the careful student of hospital architecture will not dare to plan his buildings without providing facilities for these medical treatments which have come to be grouped under the term "physiotherapy."

It is not always necessary to provide an expensive outfit for all the elaborate processes of hydro-therapy; but room can be secured in almost every hospital for a small equipment—an electric light baker, a massage table, a small bath cabinet, simple, sometimes homemade devices. When these are provided, the progressive medical man or orthopedic surgeon will be pleased; a few years from now he will demand them.

Heat is an important therapeutic agent, whether it is applied as warm air, steam, electric light, or natural sunlight; scientifically applied, it is a recognized medium for benefiting man's ills.

The airing balcony provides sunlight for the medical as well as for the surgical patient. The simplest, and many times the most potent agency, *sunlight,* can easily be provided in every institution.

In designing a new hospital there should be set apart certain rooms to be reserved for physiotherapy and equipped with proper electric and water outlets. Some of the best authorities recommend the following:

Ample outlets for electro-therapy.

For hydro-therapy, the douche may be omitted, but there should be one or more cabinet baths, of hot air or electric light or steam; usually a sitz bath; one or more tubs for continuous baths; tables for packs and for massage; a tank for fomentations, with wringer; and an accurate scale with measuring rod.

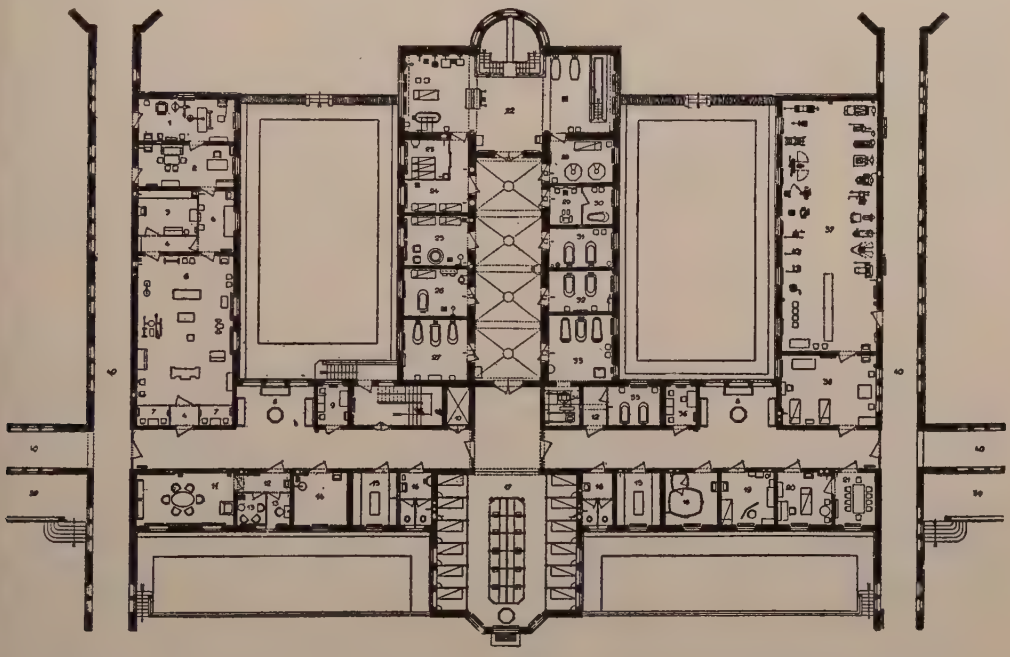
Apparatus for the application of dry heat; one light on an adjustable stand, and a small baker. These do not need special outlets, merely additional ones.

Outlets for light-therapy should be provided, since very many institutions are now using the "alpine" or "quartz" lamp, which produces the ultra-violet rays, i. e., artificial sunshine.

Mechano-therapy is advocated only if specially required and under a director, who will decide what installation is needed.

If portable apparatus is to be used in the wards, there should be convenient attachments provided for it.

The help given by scientific treatment to the so-called chronic invalids in some of the medical departments of the newer hospitals is referred to as little short of miraculous.



1. Roentgen therapeutics.
2. Physicians' room.
3. Dark room.
4. Light shaft.
5. Photograph laboratory.
6. Roentgen room.
7. Undressing room.
8. Waiting room.
9. Attendants' room.
10. Elevator.
11. Social room.
12. Ante-room.
13. Segregated room.
14. Light bath.
15. Wash room.
16. Toilet.
17. Rest room.
18. Pneumatic room.
19. Examination room.
20. Physicians' room.
21. Ante-room.
22. Douche room.
23. Hot air bath.
24. Warm air bath.
25. Vapor room.
26. Fango mud bath.
27. Mud bath.
28. Heat bath.
29. Four-cell bath.
30. Electric water bath.
31. Gas Bath.
32. Salt water bath.
33. Sand bath.
34. Sand room.
35. Sulphur bath.
36. Female attendants' room.
37. Therapeutic gymnastics.
38. Massage room.
39. Rest room.
40. Hallway.

FIG. 175. GROUND FLOOR PLAN, MEDICAL TREATMENT BUILDING, MUNICH-SCHWABING HOSPITAL, MUNICH, GERMANY
Richard Schachner, Architect

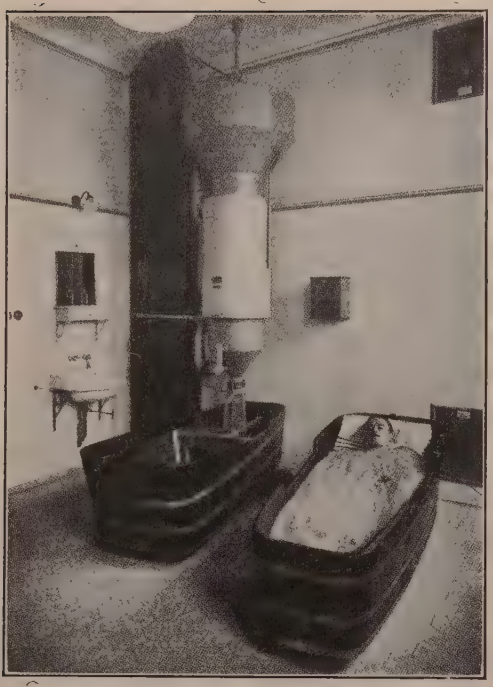


FIG. 177. SAND BATH

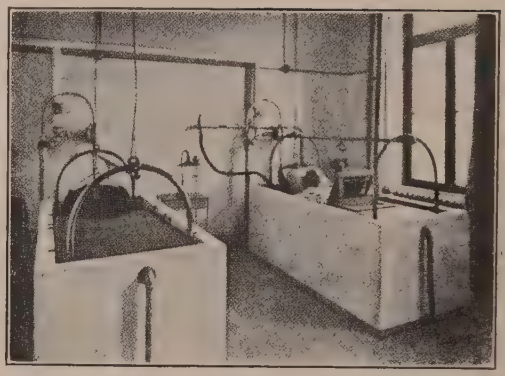


FIG. 176. WATER BED

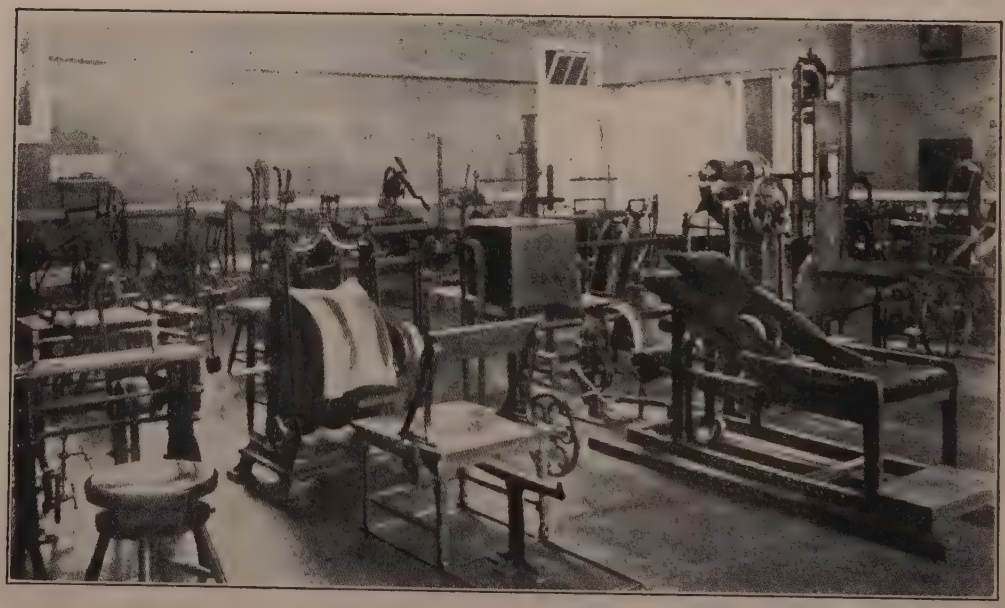


FIG. 178. ZANDER ROOM, MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASS.

To illustrate what some of the later European hospitals are doing in the line of medical equipment, a few examples are here shown.

The Virchow at Berlin, the Barmbeck at Hamburg, the Bispebjerg at Copenhagen, all have elaborate departments which are suggestive.

In the Munich-Schwabing Hospital, Munich, Germany, the plan shown (Fig 175) contains rooms for X-ray therapy, inhalation room, pneumatic chambers (for rarefied or compressed air), for mud, peat and sand baths; for $CO_2$ and electric light baths, etc. There is a large hydro-therapeutic department, with sprays, douches, plunges, continuous bath or water bed, used in mania, extensive burns,

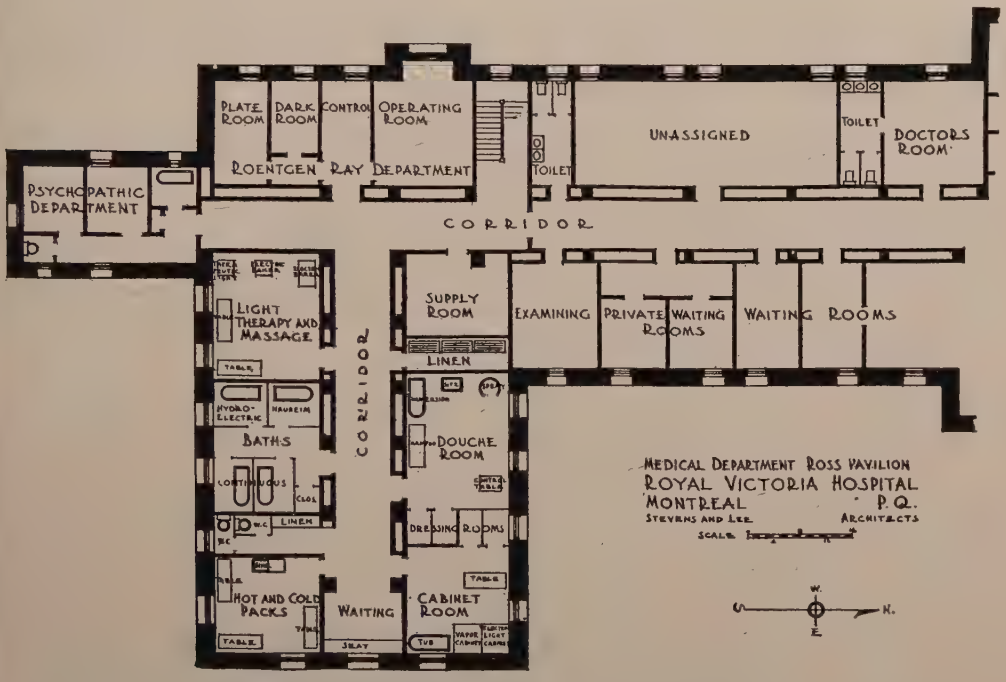



FIG. 179. ROYAL VICTORIA HOSPITAL, MONTREAL, CAN.

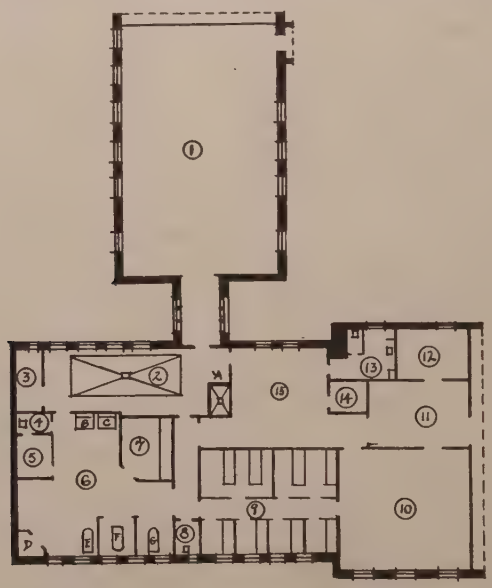
and some skin diseases. On the second floor is a large sun room, with a "water curtain" for reducing the temperature.

There are few hospitals in the world which have a more complete mechano-therapy equipment than the Massachusetts General Hospital, Boston, with its splendid Zander room (Fig. 178). The service is largely surgical.

In the St. Luke's Hospital (Fig. 36), at Jacksonville, about one-half of the second story of the administration building is set apart for medical treatment. This portion was not equipped, but was ready

whenever the demand came and the funds necessary to equip and maintain it were obtained.

In the Ross Private Pavilion of the Royal Victoria Hospital (Fig. 123) a large section is set apart and equipped for medical treatment, consisting of a small psycopathic department, Roentgen-



1. Mechanical apparatus.
2. Plunge bath.
3. Pump room.
4. Toilet.
5. Irrigation room.
6. Douche room.
7. Steam room.
8. Toilet.
9. Dressing rooms.
10. Lounge room.
11. Hall.
12. Store room.
13. Toilet.
14. Closet.
15. Office.

FIG. 180. MEDICAL TREATMENT DEPARTMENT, SAN FRANCISCO HOSPITAL, SAN FRANCISCO, CAL.

ray department, hydro-therapy, electric Nauheim, and continuous baths, rest, and massage rooms.

The medical treatment department of the Ottawa Civic Hospital, Ottawa, Canada (Fig. 85), is not elaborate, but is fairly complete. It has rooms for special tub baths, showers, sprays and douches, packs, massage, etc. There are comfortable rest and dressing rooms.

In the Cook County, Chicago, Psychopathic building (Fig. 308), there is a good hydro-therapeutic department, with arrangements for continuous baths, packs, etc. Rest rooms are provided. There is also a room for surgical dressings here.

The Southern Pacific and the San Francisco County (Fig. 180) Hospitals, both at San Francisco, not only have very complete

FIG. 181. HYDRO-THERAPEUTIC ROOM, OTTAWA CIVIC HOSPITAL, OTTAWA, CAN.

FIG. 182. ELECTRICAL TREATMENT ROOM

physiotherapy equipment but are using it constantly with the best results.

*The Department of Occupational Therapy.** Departments of occupational therapy are now being established in sanitoria, psycho-

*The author is indebted for this material to Minnie Goodnow, R. N.

pathic hospitals, and also in general hospitals. Certain facilities are necessary for them to operate successfully.

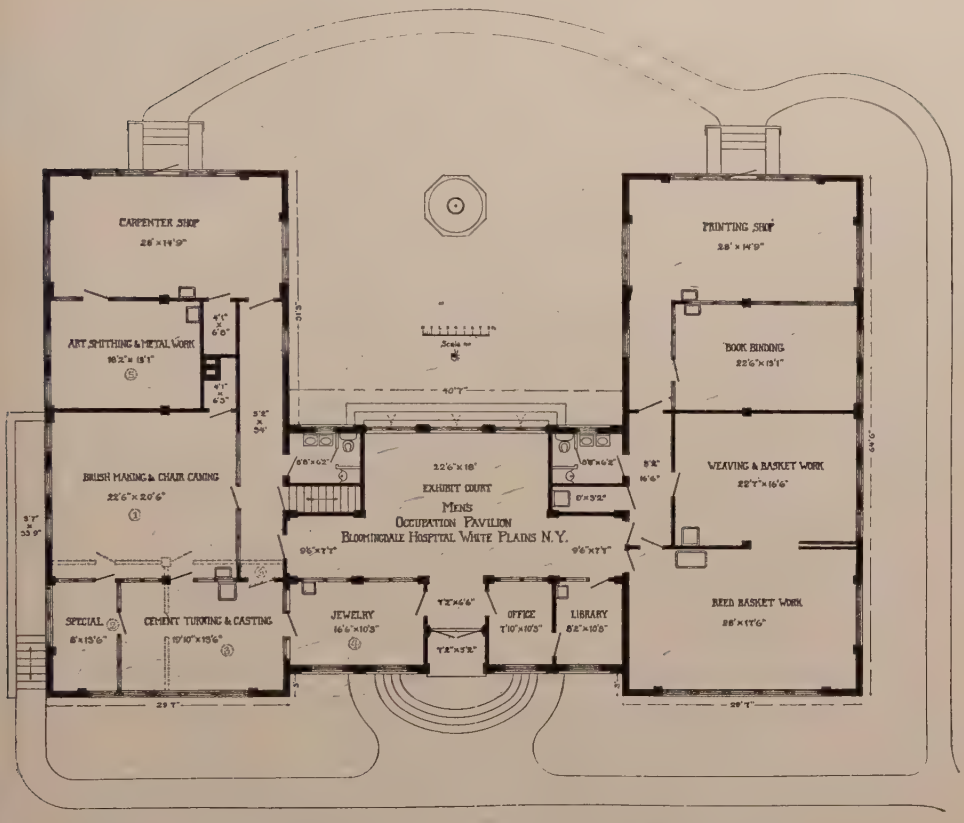
There will always be some work done by bed-patients and some by up-patients. For the bed-patients, there should be storage space for materials and unfinished work near the wards in which they are; a shelf in the linen closet may be sufficient.

Up-patients usually prefer to go to a special occupation room. This should, when possible, be located near a group of wards, so that it may be easy of access. Very often the patients' sitting room or a sun-parlor may become the occupation room.

FIG. 183. ULTRA-VIOLET-RAY TREATMENT

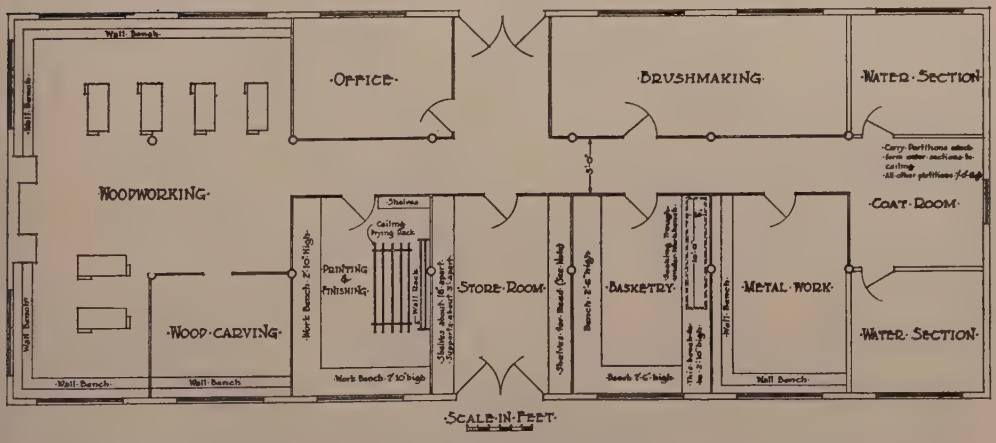
With men patients, a part or all of the occupation room should be a shop, one which *looks* like a shop, with a floor that will not be injured by shavings and other debris. If basketry is done, by either men or women, a small tub of water will be needed; the table and floor should therefore be of material not harmed by wetting.

If the occupation room or shop is at a distance from the wards, it should have near it a rest room furnished with a couch and easy chairs. Overdoing is always to be guarded against, and the teacher of occupation will need to have facilities for her patients to rest at proper intervals.




Courtesy of *Modern Hospital*

FIG. 184. Men's Occupational Shops
BLOOMINGDALE HOSPITAL, WHITE PLAINS, N. Y.




Courtesy of *Modern Hospital*

FIG. 185. Occupational Building
STATE HOSPITAL, COLLINS, N. Y.

The occupation room or shop must have *good light*, preferably sunshine, and ample artificial lighting for dark days. Plenty of *storage space* for bulky materials is necessary in closets or cupboards with shelves, hooks, drawers or boxes for small articles. There should be a place to lock up small tools. In even a small department one needs a table or bench for woodwork, a large table for basketry and a table for painting. There should be space to store partly finished

FIG. 186. BASKET ROOM, PHIPPS PSYCHIATRIC CLINIC, JOHNS HOPKINS HOSPITAL, BALTIMORE, MD.

FIG. 187. OCCUPATION ROOM, CHICAGO STATE HOSPITAL

work, and a cupboard with lock for finished articles. In most institutions a display case will be placed in or near the main office, so that visitors may see the patients' work, or purchase it.

Fig. 184 shows the plan of the men's occupational shops at Bloomingdale Hospital, White Plains, New York, where an elabo-

rate program is carried out with mental cases. Fig. 185 is a plan of a building remodelled for occupational therapy at the STATE HOSPITAL, Collins, New York. Most mental hospitals are finding occupation a valuable curative agent and are providing more or less extensive departments for it.

Miss Susan E. Tracy, an authority on occupation, suggests that an occupation room may be a sitting room, veranda, roof garden, sun parlor, or any large room. She specifies as hindrances to satisfactory work basement rooms with poor light, noisy rooms, parlors or rooms with furnishings that are easily damaged, very small rooms or those reached by long corridors.

Most institutions which established this work find it quickly outgrows its original quarters. Space is therefore the great need, and rooms large enough for several good-sized work tables.

FIG. 188. OCCUPATIONS CARRIED ON IN THE WARD SOLARIUM, GENERAL HOSPITAL NO. 3, RAHWAY, N. J.

# CHAPTER VII

## THE MATERNITY DEPARTMENT

THERE is a growing call for maternity service in nearly every hospital, whether it be large or small. This has made it necessary to establish an obstetrical department, either by setting apart a section of some building, calling into requisition an existing dwelling near the institution, or erecting a new building or group of buildings for this one service.

Most obstetricians declare that the maternity service should be classed as surgical, since the area of open wound is greater than in almost any other clean surgery, and hence is subject to greater danger of infection from outside. Certainly modern asepsis plays its part in this department, and many a mother owes her health and perhaps her life to the modern methods of care.

Moreover there are many emergencies arising which can neither be foreseen nor prevented, and which can be properly dealt with only by extra help and under hospital conditions.

In order to care for obstetric cases to the best advantage, the hospital or department must be specially planned for the work. Study is necessary toward minimizing the noises of preparing and serving food, provision should be made for privacy or semi-privacy in the ward, and preparation made for emergency conditions.

The location of this department in the hospital group should have most careful study for two reasons:

1st—Because, owing to the crying of the infants, it can well be called the most noisy of all the departments; and

2nd—Because, owing to the possible danger of infection from outside sources, it should be as far removed as possible from the other buildings, and should not be used as a passageway to any other buildings.

There are four distinct departments to be considered in planning for obstetrical cases:

1. The waiting department.
2. The delivery or confinement rooms.
3. The puerperal or after-confinement rooms.
4. The creche or nursery.

*Waiting Department.* With private patients, as a general thing, the patient goes to the hospital but a day or two before, or even on the

day of delivery, and occupies at once the room or bed that will be hers during her recovery. In hospitals where charity patients predominate the patients frequently enter from one to three months before confinement. Such women assist about the hospital work and in a measure repay for their care when sick. Where such a practice prevails separate wards or dormitories must be provided. In charity homes for unmarried mothers the situation is the same, and in many the waiting departments are larger than the hospital proper.

*Delivery Rooms.* The delivery rooms, with their sterilizing rooms, labor rooms, doctors' waiting room, etc., should be cut off from the rest of the department by doors. This department should be treated in its details like an operating suite.

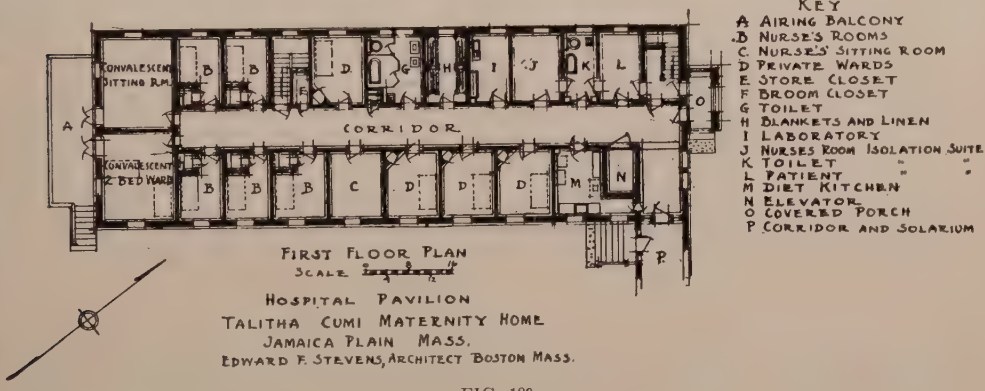



FIG. 189

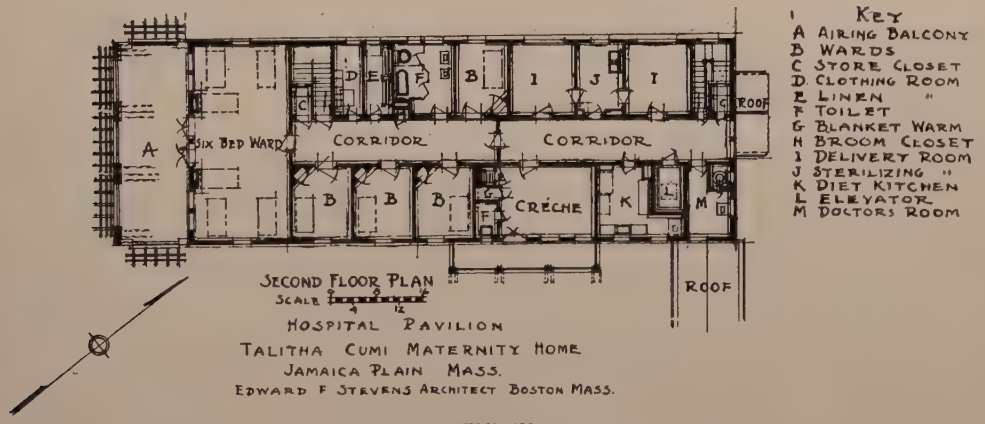
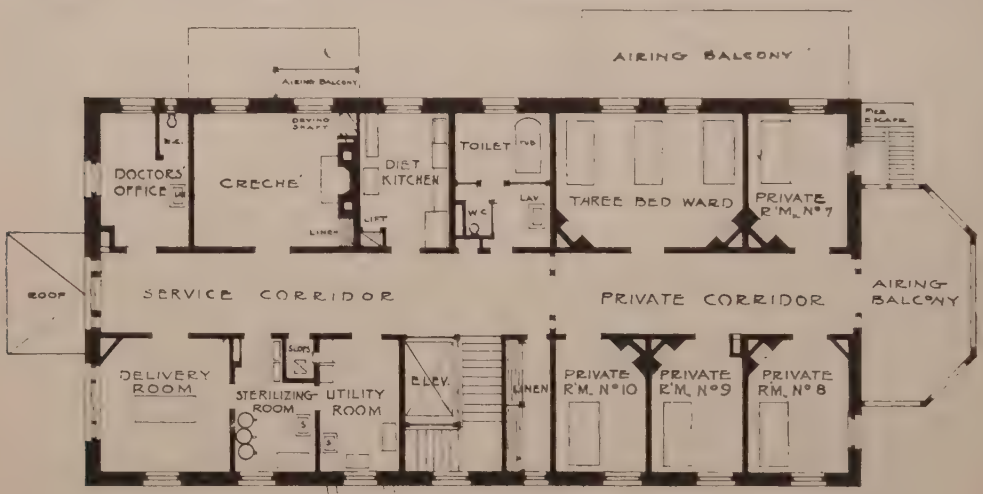



FIG. 190

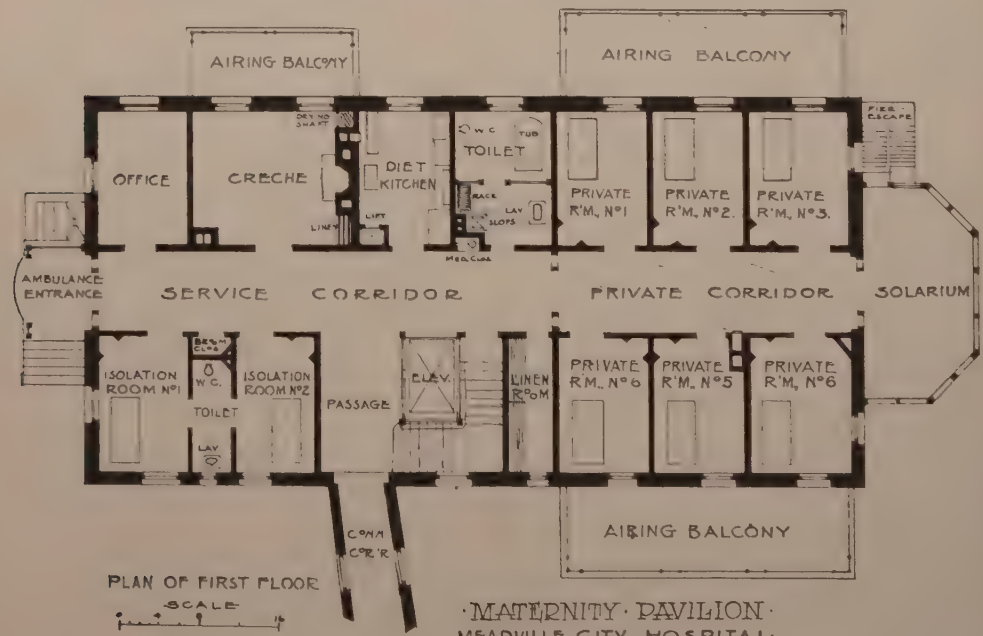
The delivery rooms should be large, well lighted, and well ventilated; should, in fact, be operating rooms with all the careful finish and detail, and should be equipped both for day and for night work.

Either a special sterilizing room should be provided, or sterilizers for water, utensils and instruments must be placed in the delivery room.

There should at least be one scrub-up sink in or near each delivery room. In hospitals where mixed cases, colored and white, free and




PLAN OF SECOND FLOOR




PLAN OF FIRST FLOOR
SCALE

·MATERNITY · PAVILION·
·MEADVILLE·CITY · HOSPITAL·
· MEADVILLE, PENN·
·EDWARD·F·STEVENS·ARCHITECT
·BOSTON · MASS·

FIG. 191

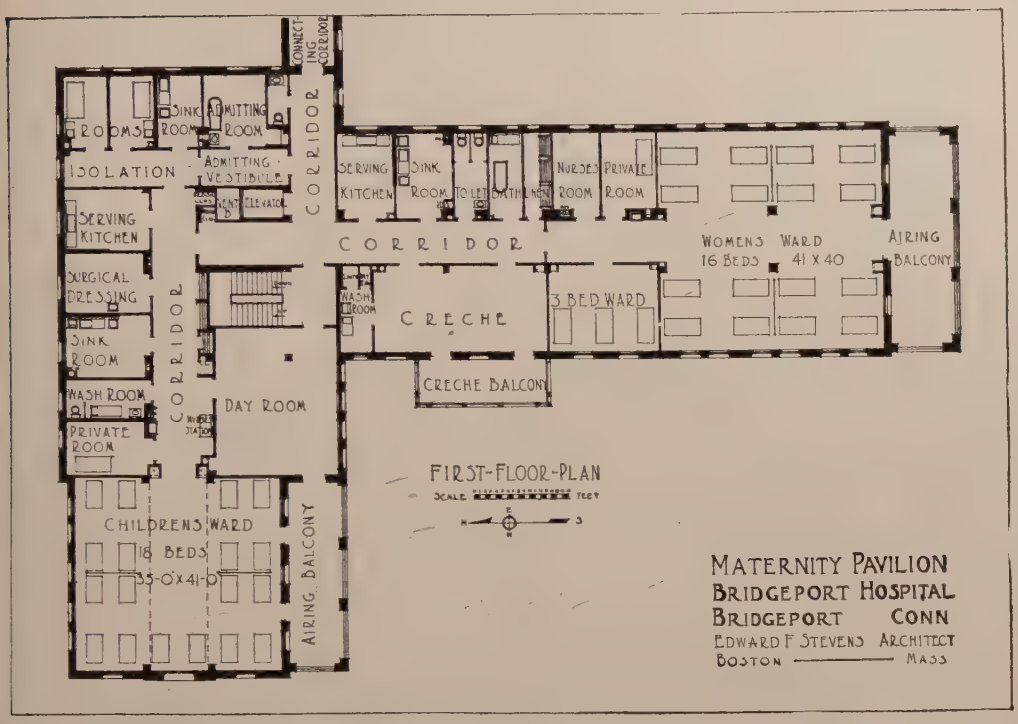



FIG. 192. MATERNITY BUILDING, BRIDGEPORT HOSPITAL, BRIDGEPORT, CONN.

pay, are taken, it is considered wise to provide separate delivery rooms for the different classes.

*Patients' Rooms.* If open wards are used, it is well to have them small; or, if the ward is large, subdivided by fixed screens. A certain number of private rooms should be provided, and perhaps a few suites with baths. The finish and detail, toilets, sinks, baths, etc., should be similar to those of the surgical wards of the hospital.

Airing balconies should be provided as in the medical and surgical wards, or solaria can be added if found desirable.

There should be opportunity for the isolating of the occasional cases which may be infected. A simple suite of two rooms and a bath, which will serve as a general utility room, should be arranged on a separate corridor entered from the main corridor, and with an outside entrance as well, if possible. This arrangement will give opportunity for such isolation, but will not prevent the use of these rooms for regular work. The rooms should be treated and equipped the same as isolation wards for contagious cases.

*Creche or Nursery.* The nursery should be light, well-ventilated, cheerful and warm, and well away from the mothers. There should

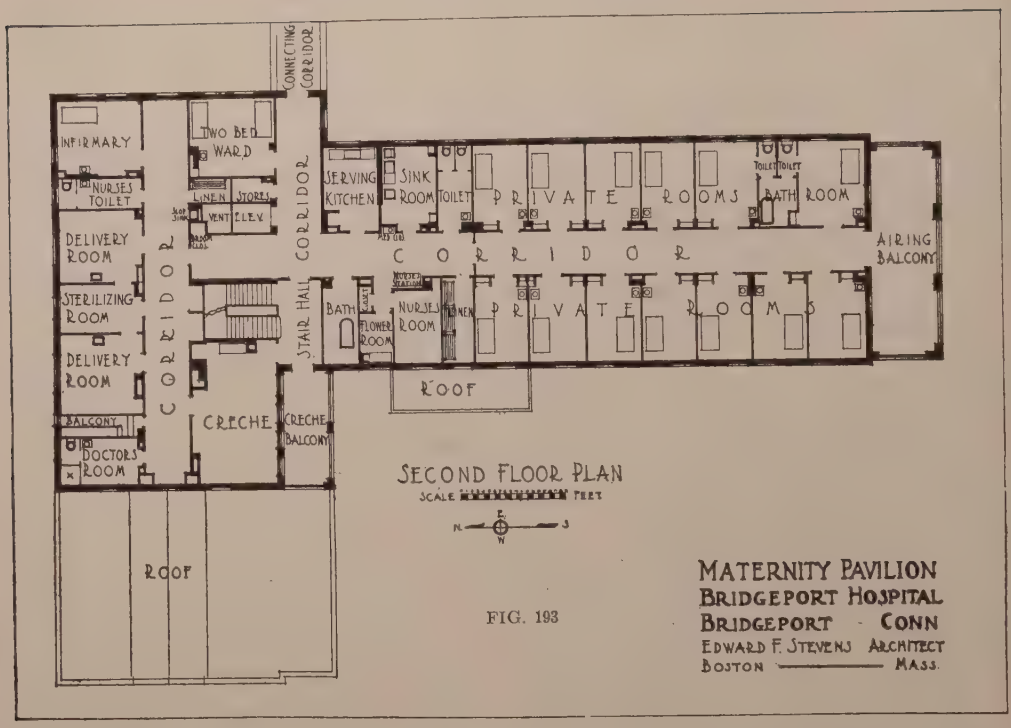



FIG. 193

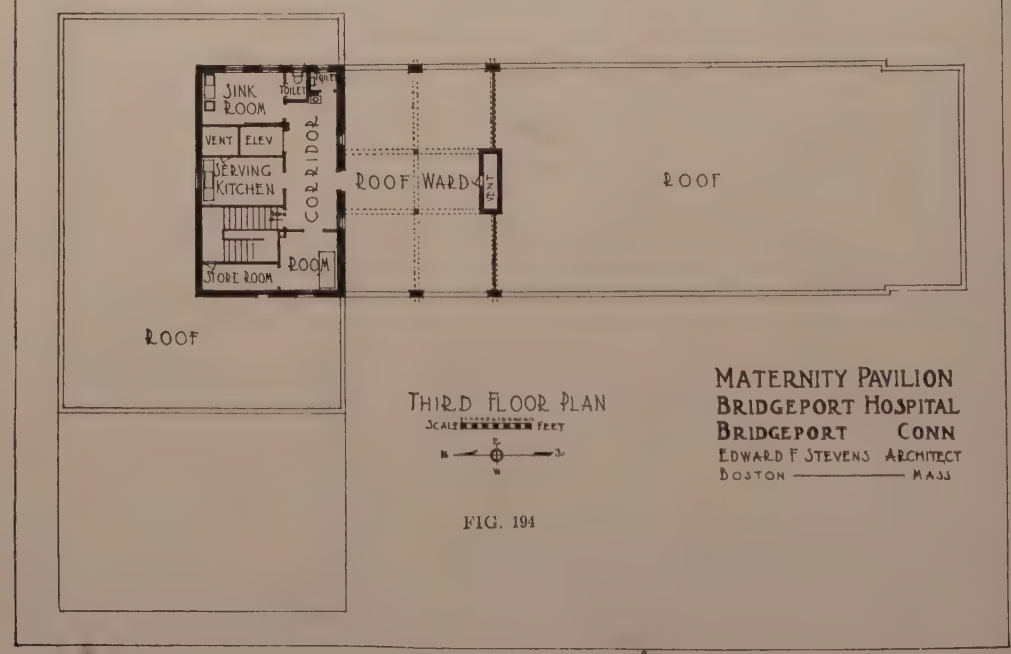



FIG. 194

FIG. 195. EXTERIOR, MATERNITY BUILDING, BRIDGEPORT HOSPITAL, BRIDGEPORT, CONN.
Edward F. Stevens, Architect

FIG. 196. MATERNITY WARD, BRIDGEPORT HOSPITAL, BRIDGEPORT, CONN.

FIG. 197. PRIVATE ROOM, MATERNITY BUILDING, BRIDGEPORT HOSPITAL, BRIDGEPORT, CONN.

FIG. 198. Creche, Maternity Building
BRIDGEPORT HOSPITAL, BRIDGEPORT, CONN.

FIG. 199. MATERNITY OPERATING ROOM, BRIDGEPORT HOSPITAL, BRIDGEPORT, CONN.

be not only space for a separate bassinet for each baby, but a separate room for bathing and dressing. A balcony should connect with this room, so that the babies may be easily kept out of doors in suitable weather. Linen closet, blanket warmer, linen dryer, etc., should be planned. If the department is large a creche may be provided for ward babies and another for those belonging to private patients.

The Talitha Cumi Maternity Hospital (Fig. 641), Jamaica Plain, Massachusetts, is an institution for young, unmarried mothers. The waiting department is larger than the hospital proper and is arranged as an industrial home. In this building are the offices of the institution, the kitchen, and dining rooms. The hospital proper is connected with the waiting department by a closed corridor.

On the first floor of the hospital building (Fig. 189) is a six-bed ward, three private rooms, and an isolating suite so arranged that the doors leading into the corridor can be closed and the suite reached from the service staircase and from out-of-doors. There are toilets, bath, linen room, diet kitchen, and creche on this floor. An airing balcony and a solarium afford outdoor facilities.

The second floor (Fig. 190) is similar, except that the delivery

FIG. 200. ST. LUKE'S HOSPITAL, NEW BEDFORD, MASS. MATERNITY DEPARTMENT

FIG. 201. ST. LUKE'S HOSPITAL, NEW BEDFORD, MASS. MATERNITY DEPARTMENT
Edward F. Stevens, Architect

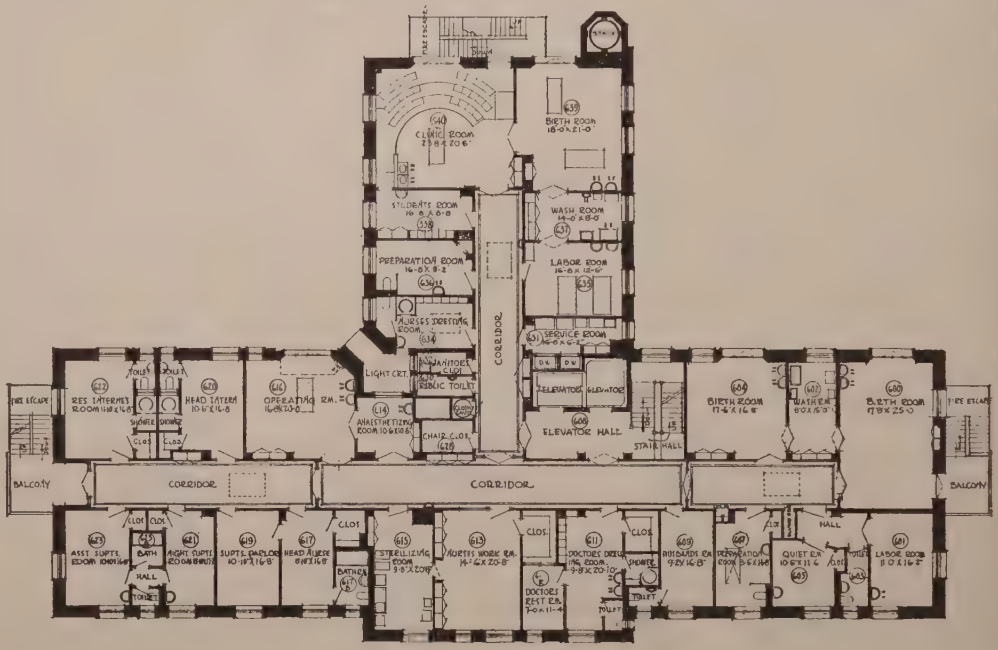



FIG. 202. Third Floor

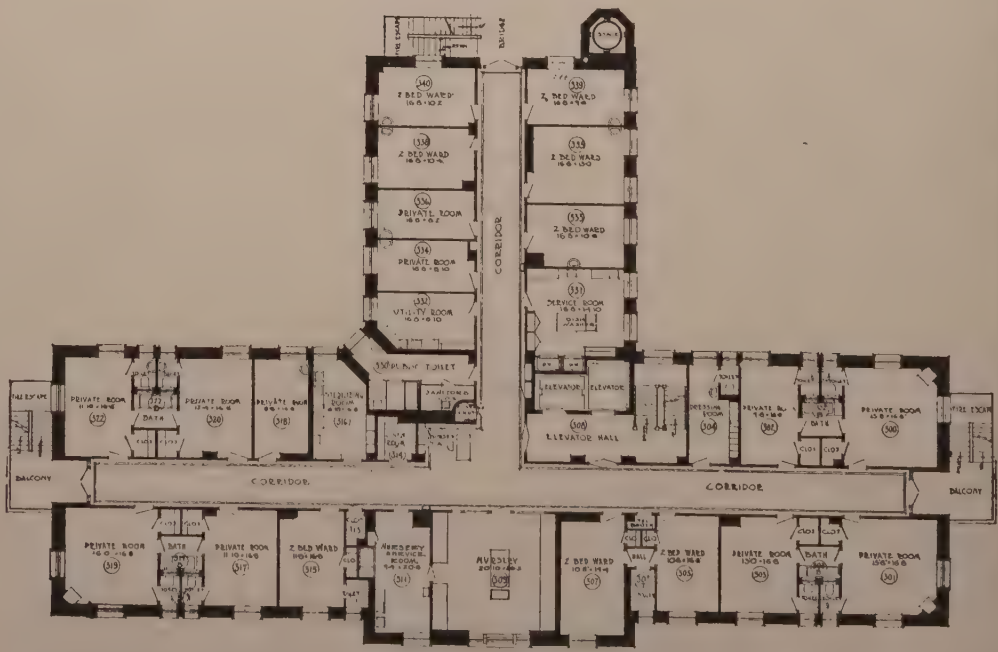



FIG. 203. Sixth Floor

CHICAGO LYING-IN HOSPITAL, CHICAGO, ILL.
Richard E. Schmidt, Garden & Martin, Architects

rooms replace the isolating suite. There are two delivery rooms connected by the sterilizing room, and a doctors' room across the hall. The delivery rooms are cut off from the patients' part of the hospital by double doors.

Meadville Hospital, Meadville, Pennsylvania, has a separate pavilion for the maternity service (Fig. 191). This pavilion is at the extreme end of a group of buildings. It is two stories in height, with elevator.

There is but one public ward, the remainder of the patients being in private rooms. On the first floor is an isolation suite and a nurses'

FIG. 204. FIRST FLOOR, JENNIE B. ROBINSON MEMORIAL, MASSACHUSETTS HOMEOPATHIC HOSPITAL, BOSTON, MASS.
Kendall, Taylor & Company, Architects

office. The delivery room, sterilizing room, doctors' room, etc., are on the second floor. Each floor has a creche, which contains an unusual feature, a fireplace. There are the usual airing balconies and a solarium.

In the maternity department of the Bridgeport Hospital (Figs. 192 and 193) the ward unit is somewhat different from that of any of the other hospitals mentioned in this chapter. In the main sixteen-bed ward the principle adopted in the Rigs Hospital is introduced—that is, there are four groups of four beds each, and these groups are divided by stationary screens, six feet in height, giving the semi-isolation needed in these rooms.

The creche (Fig. 198), as well as the serving kitchen and sink room, is at a distance from the ward and private-room patients.

In this plan an admitting unit is provided, in which the careful

examination and bathing of patients are conducted. Adjoining this admitting unit is the isolation unit, in which any suspicious case can be kept for observation. This isolation department is connected with the serving kitchen of the children's department by a slide. Directly under the slide is the dish sterilizer, the cover of which is controlled from both sides of the partition, so that the infected china can be returned through the dish sterilizer.

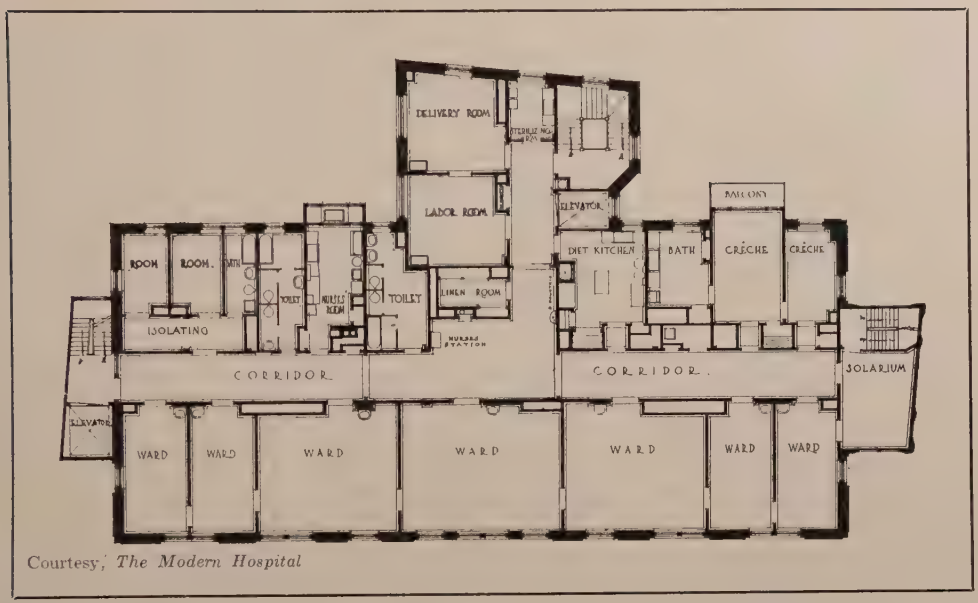
The children's ward unit in this building is similar to the maternity ward unit, except that the screens are of clear glass, permitting the nurse on duty to have close observation of all the children and still affording the necessary isolation.

FIG. 205. SECOND FLOOR, JENNIE B. ROBINSON MEMORIAL, MASSACHUSETTS HOMEOPATHIC HOSPITAL, BOSTON, MASS.
Kendall, Taylor & Company, Architects

The maternity department of the Ohio Valley General Hospital (Fig. 109) is situated at the end of one of the wings, and consists of wards and private rooms, two delivery rooms, a creche, and waiting room. Cases needing isolation are taken to the isolating department in the same building.

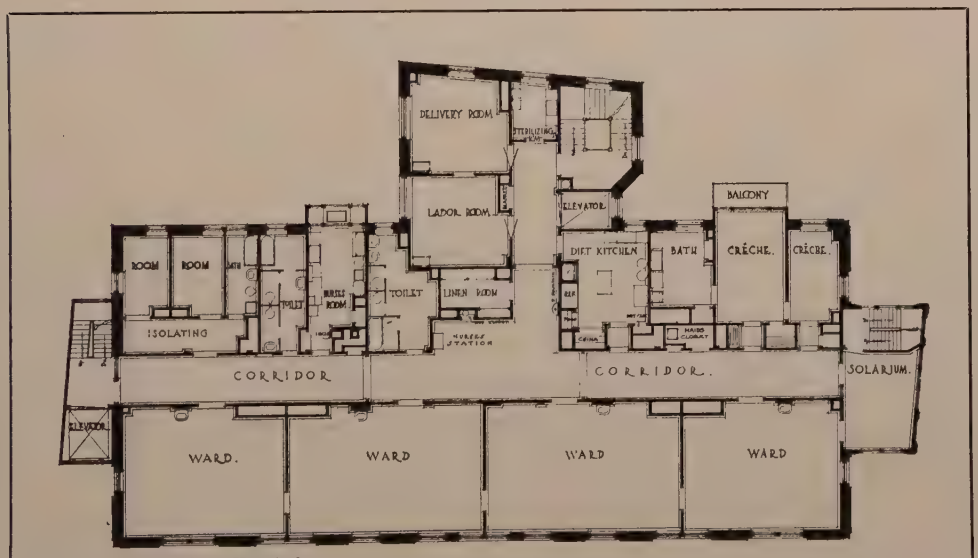
At the St. Luke's Hospital (Figs. 200 and 201), New Bedford, this service is taken care of in a separate building, with a nearly ideal arrangement of rooms and service.

Placed at the extreme end of the group and adjoining the ambulance entrance of the operating department, the admitting service is simple. The staff sitting room at this point makes a special waiting room unnecessary. There is, however, a husband's waiting room provided for the anxious fathers-to-be.




Courtesy, *The Modern Hospital*

FIG. 206. THIRD FLOOR, JENNIE B. ROBINSON MEMORIAL, MASSACHUSETTS HOMEOPATHIC HOSPITAL, BOSTON, MASS.
Kendall, Taylor & Company, Architects




Courtesy, *The Modern Hospital*

FIG. 207. FOURTH FLOOR, JENNIE B. ROBINSON MEMORIAL, MASSACHUSETTS HOMEOPATHIC HOSPITAL, BOSTON, MASS.
Kendall, Taylor & Company, Architects

FIG. 208. EXTERIOR, BOSTON LYING-IN HOSPITAL, BOSTON, MASS.
Coolidge & Shattuck, Architects

The admitting room, with entrance bath, adjoins the delivery corridor. There are three delivery rooms for the three services—public, semi-private and private.

The public wards, two of eight beds each, accommodate the only patients on the first floor, except the occasional isolated case, access for which is from a separate corridor. These ward beds are separated into groups of four by screens, upon which are located the nurses' calls and bedside lights.

The CHICAGO LYING-IN HOSPITAL (Figs. 202 and 203), designed in conference with Dr. Joseph De Lee, the well-known obstetrician, is planned on the broad, generous basis of the comfort of the patient, the isolation of sound, and the convenience of management. The nurses' station, located as it is at the crossing of the corridor at the elevator entrance, makes possible the easy surveillance of the entire floor. The nursery and service rooms are placed with regard to care and easy service.

On the sixth floor (Fig. 203) are located the operating section, the birth and labor rooms, so placed as to allow the utmost flexibility of service and at the same time the utmost privacy when privacy is required.

The sterilizing and nurses' room is centrally located. There is a waiting room for the husband and expectant father.

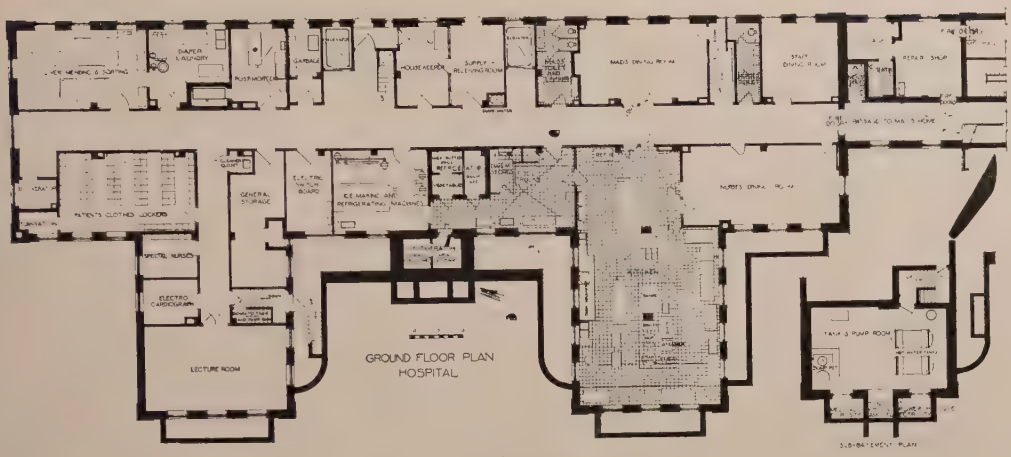



FIG. 209

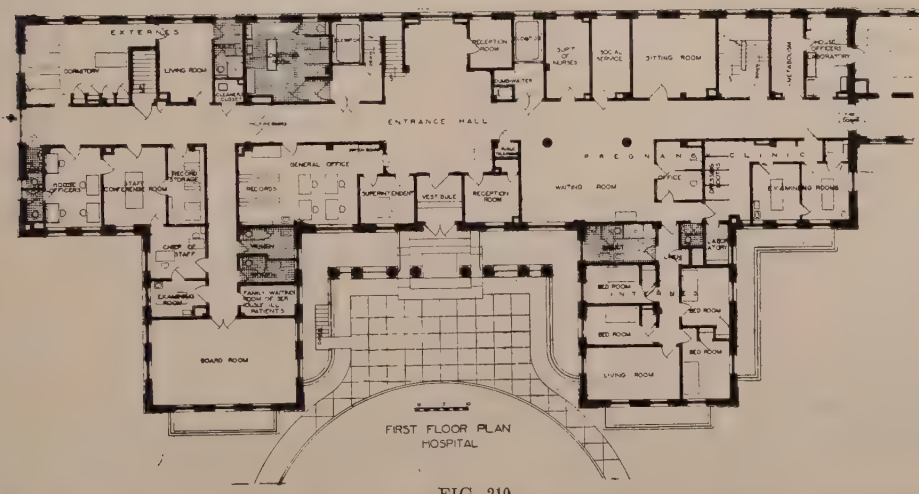



FIG. 210

FIG. 211
BOSTON LYING-IN HOSPITAL, BOSTON, MASS.
Coolidge & Shattuck, Architects

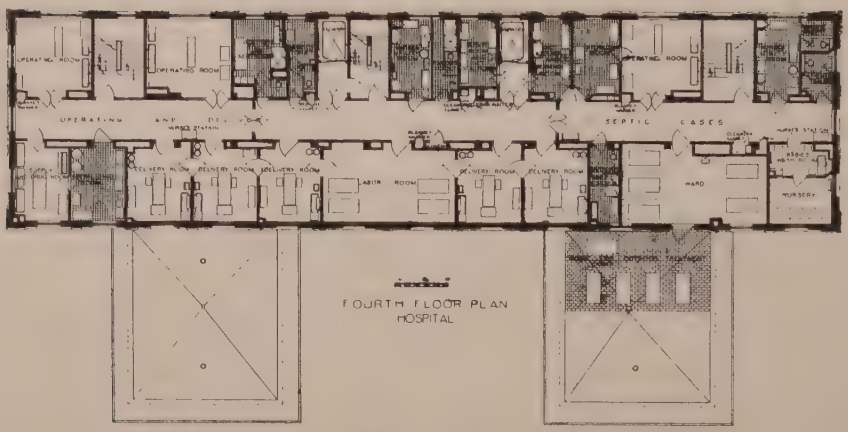



FIG. 212. BOSTON LYING-IN HOSPITAL, BOSTON, MASS.
Coolidge & Shattuck, Architects

The Jennie M. Robinson Memorial of the Massachusetts Homeopathic Hospital, Boston (Figs. 204-207), presents the unique combination of an out-patient and a maternity department. The out-patient department occupies the ground and first floors, the entrance for the maternity being on another street. The prenatal clinic is on the second floor.

The third floor is for public ward patients, the fourth for semi-private, the fifth for private patients. The largest wards have ten beds. Delivery and labor rooms are provided on the three floors, these being in a wing isolated from the rest of the floor. The nurseries are conveniently placed, yet well shut off. On each floor there is an isolating department for special cases or for twilight sleep. The duplication of service would not be necessary in most hospitals.

The Boston Lying-in Hospital (Figs. 208-212) is considered an excellent and most practical plan for a hospital entirely devoted to maternity work. In the basement are kitchen, dining rooms, store rooms, etc., with a special laundry for diapers. On the first floor are the administration and admitting departments, the out-patient department, and quarters for internes and externes. On the second and third floors are rooms and wards, with nurseries (a separate one for premature babies) and isolation rooms for septic cases. The fourth floor contains labor, delivery and operating rooms, with divisions to control sound and secure privacy.

Built in the early Gothic style of architecture, the Providence Lying-in Hospital (See frontispiece), at Providence, Rhode Island, will function wholly for maternity work, with a small prenatal out-patient department on the ground floor. (Figs. 213-216.)

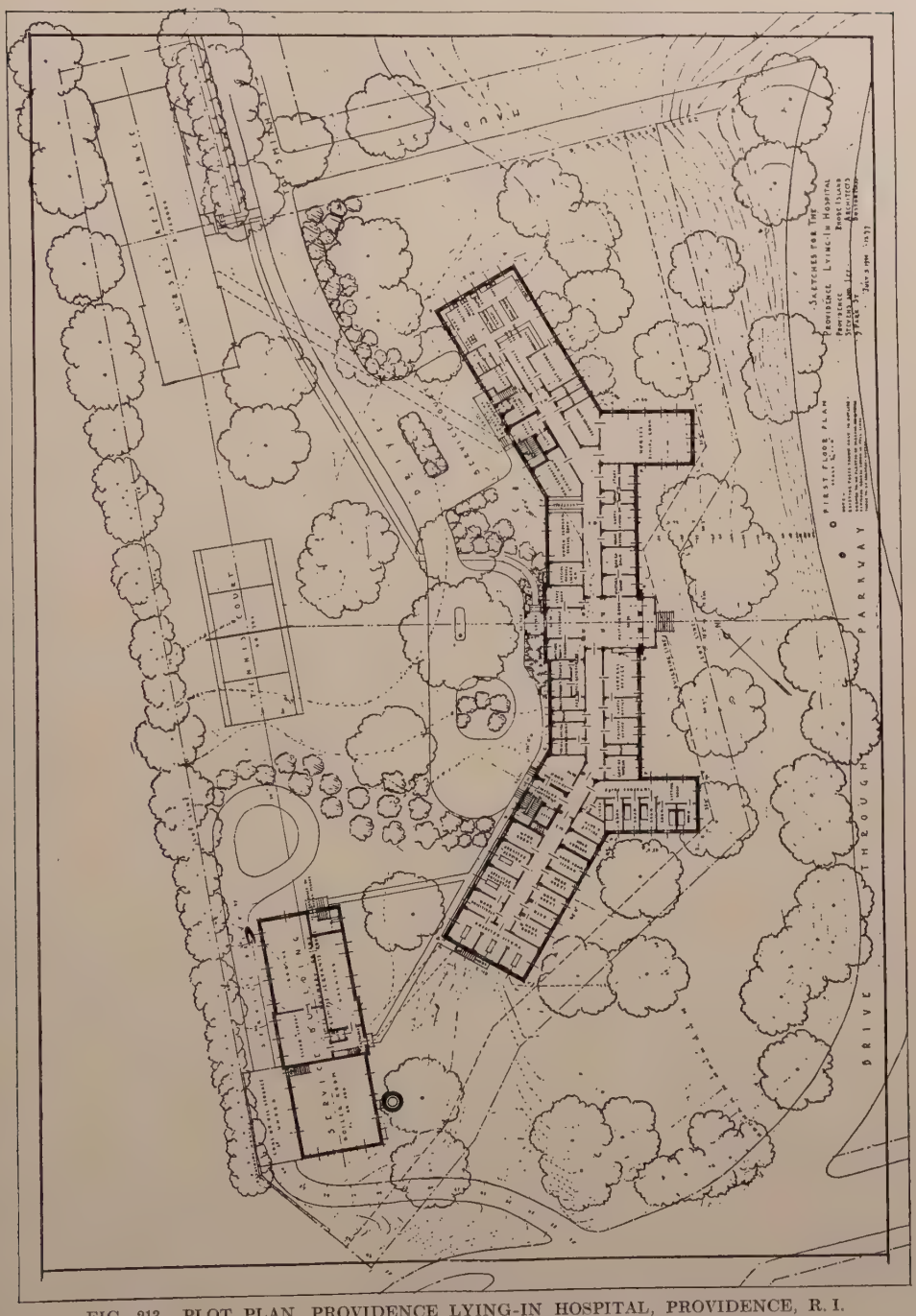



FIG. 213. PLOT PLAN, PROVIDENCE LYING-IN HOSPITAL, PROVIDENCE, R. I.
Stevens & Lee, Architects

The form of the plan, which is the "bent angle" unit, was determined upon for two reasons: 1st, that the contour of the lot might be conserved, and 2nd, that this form gave a better exposure to light and air. The patients' side of the hospital faces one of the city parks with which Providence abounds, while the court or entrance side affords sheltered approach in all kinds of weather.

This is a self-contained hospital, having under one roof the hospital, power plant, laundry, kitchen and refrigerating plant.

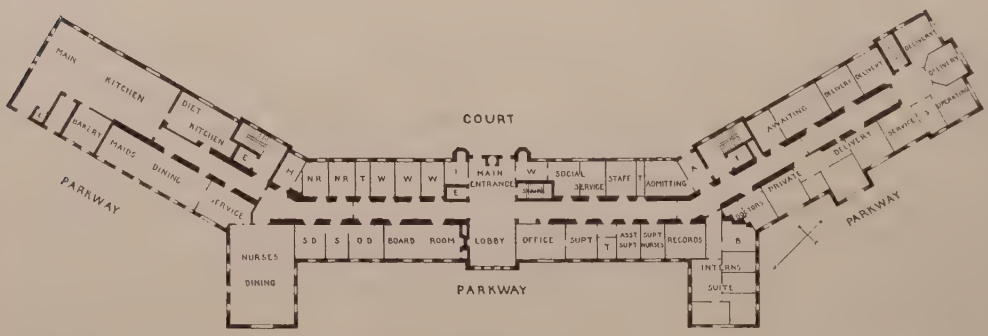



FIG. 215. First Floor

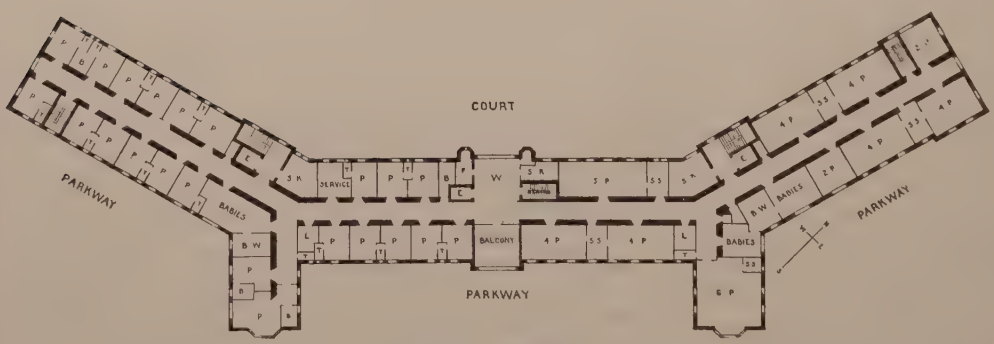



FIG. 216. Third Floor

PROVIDENCE LYING-IN HOSPITAL, PROVIDENCE, R. I.

The entire first floor is used for service. At the west end are provided the domestic service department; at the center, the administration; and at the east, the delivery and operating section, thus separating all noise-producing departments from the patients who occupy the second, third and fourth floors. There are no large wards and all wards as well as private rooms have direct connection with utility rooms and toilets.

Large day rooms, central nurses' stations, and ample utilities on all patients' floors are noteworthy features. Provision is made for 165 beds.

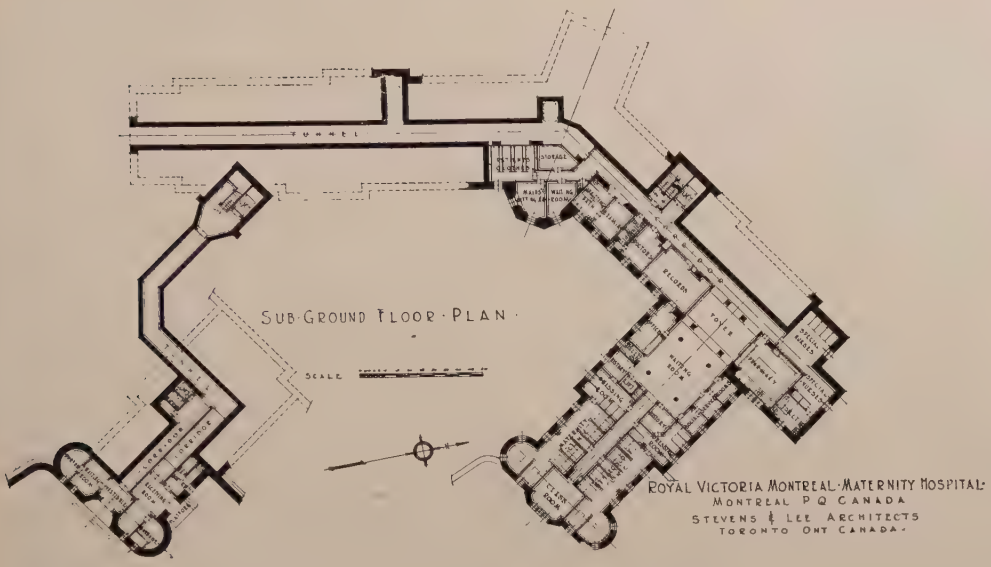



FIG. 217. OUT-PATIENT DEPARTMENT

The latest addition to the Royal Victoria Hospital group of buildings is the new maternity pavilion, erected on the same general level as the Ross Pavilion, built on the side of Mount Royal. This will be devoted wholly to maternity and gynecological treatment, with prenatal and out-patient departments (Figs. 217-221C).

Owing to the steepness of the grades, the out-patient entrance is at a level equal to three stories below the main entrance, which is reached by tunnel and lifts. The angle plan is adapted to accommo-

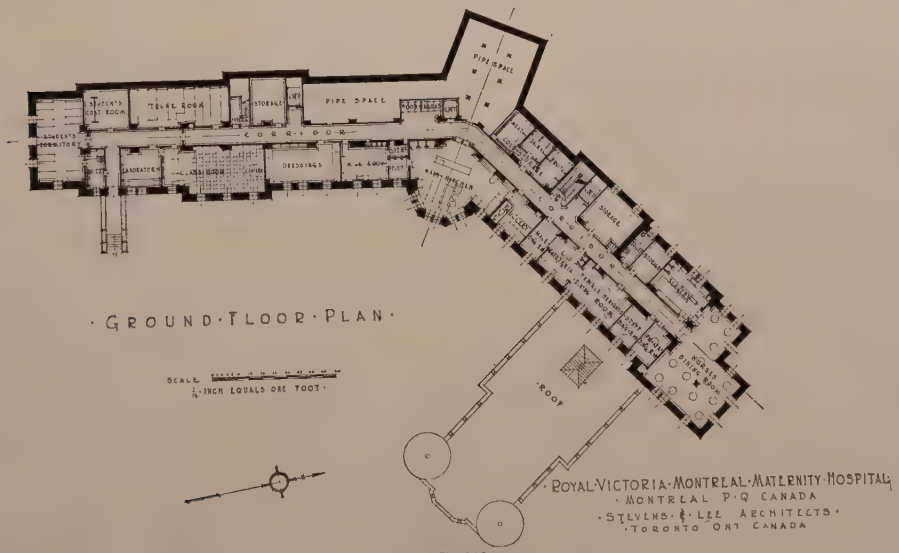



FIG. 218

FIG. 219A. EXTERIOR, ROYAL VICTORIA MATERNITY PAVILION, MONTREAL, CAN.
Stevens & Lee, Architects

date the building to the contour of the land and to conserve light and air.

While a part of and under the direction of the ROYAL VICTORIA HOSPITAL, this is a self-contained building, having its own kitchen and nurses' dining rooms, also containing on the upper stories the housing of the nurses.

Both private and public cases are provided for. Delivery rooms are located centrally on different floors, and an operating theatre is provided on the fifth floor. There are also lecture and clinic rooms. There are beds for 200 patients and for 100 nurses.

Fig. 219A shows this building in relation to the Ross private patients' pavilion, which is described elsewhere.

The Maternity and Children's Building of the QUINCY CITY HOSPITAL (Figs. 222-223D), as circumstances often require, functions for the maternity and children's departments. The maternity department occupies the first and second floors and the children's department the third floor, with free use of the roof for recreation.

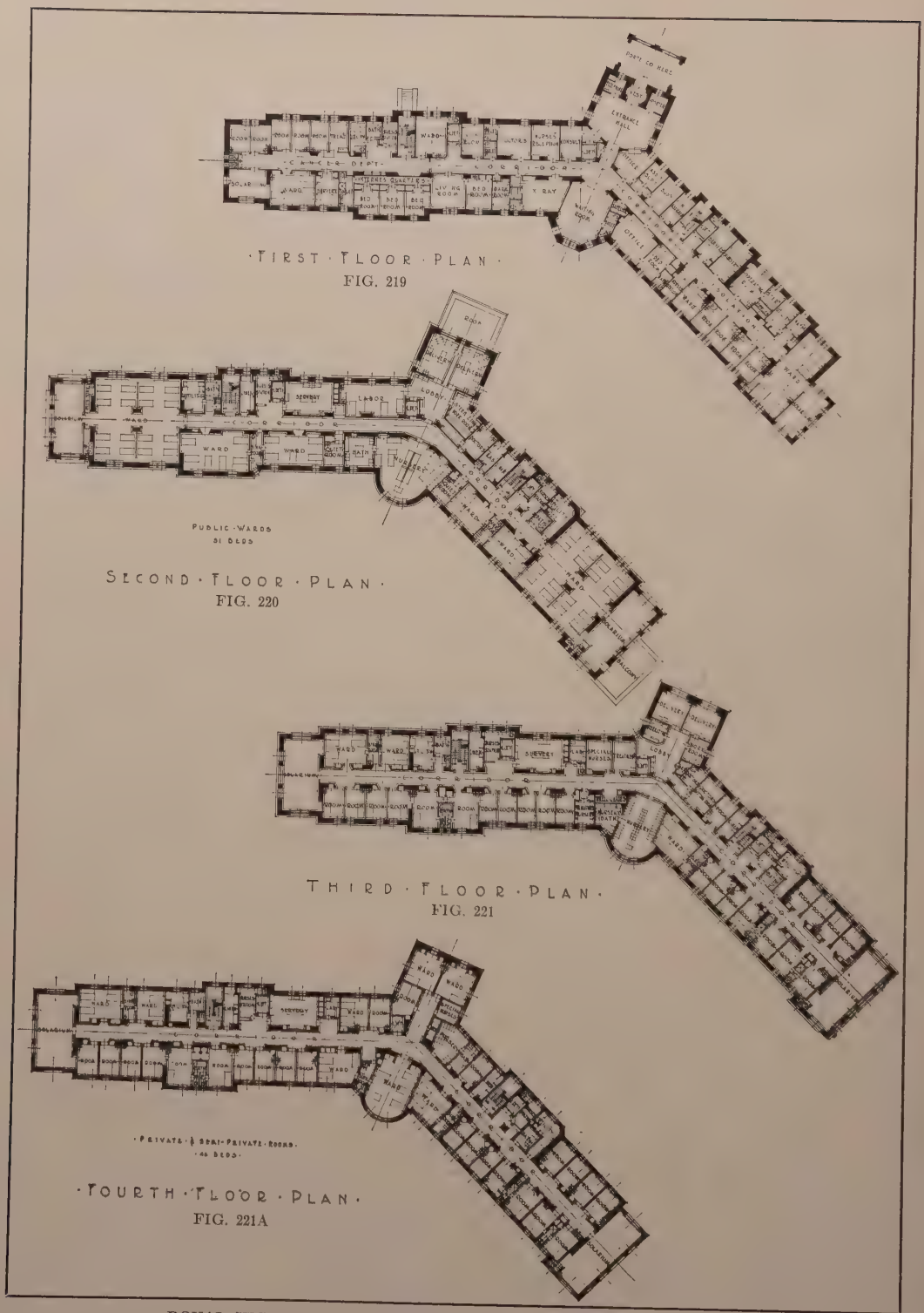
FIG. 219B. GENERAL VIEW, ROYAL VICTORIA HOSPITAL, MONTREAL, CAN.

The plan needs little description. The delivery section is placed at the north on one floor, with the airing balcony and wards at the south. A few variations from the usual arrangement and equipment may be noted in this building, such as the combination of the nurses' station with built-in linen and medicine cabinets, at the same time securing cross light and ventilation at the center of the building.

In the children's department there is some departure from the general ward unit and a ward with a low wall with slanting roof with monitor vents is used. This ward is superimposed upon the flat roof of the two-story building, providing ideal light and air for the children, also offering more open-air balconies on either side of the ward and a play room of generous dimensions at the south end of the building. (See also Figs. 223B, C, D.) All beds are placed in cubicles and scrub-up bowls are provided at frequent intervals.

This has proved to be one of the most economical units to build that we have record of.

Of the modern hospitals of England, perhaps none is more com-




ROYAL VICTORIA MATERNITY PAVILION, MONTREAL, CANADA
Stevens & Lee, Architects

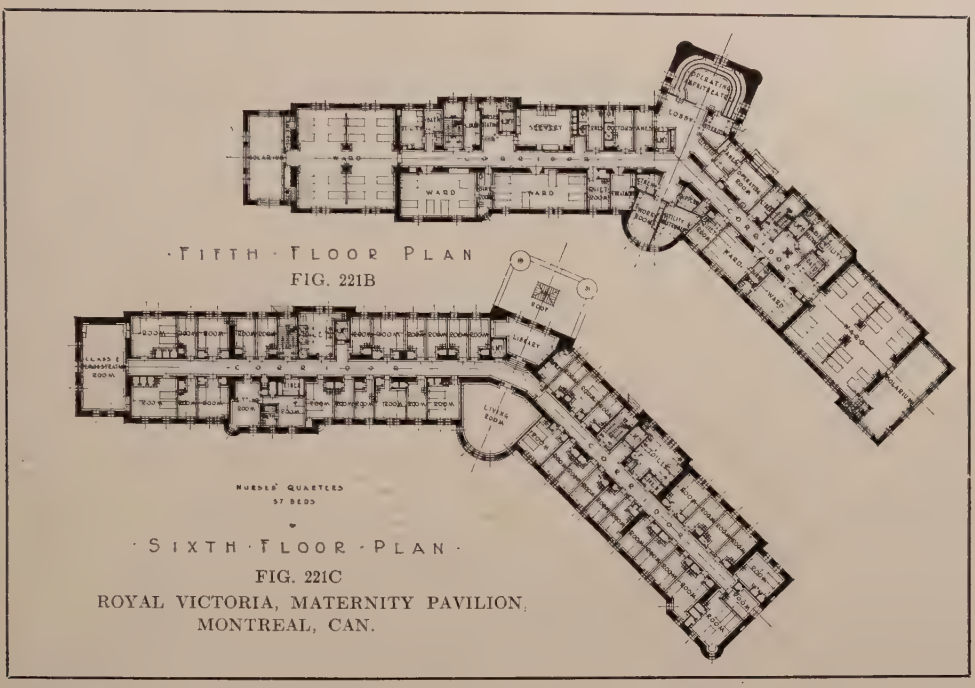



FIG. 221B

FIG. 221C

ROYAL VICTORIA, MATERNITY PAVILION, MONTREAL, CAN.

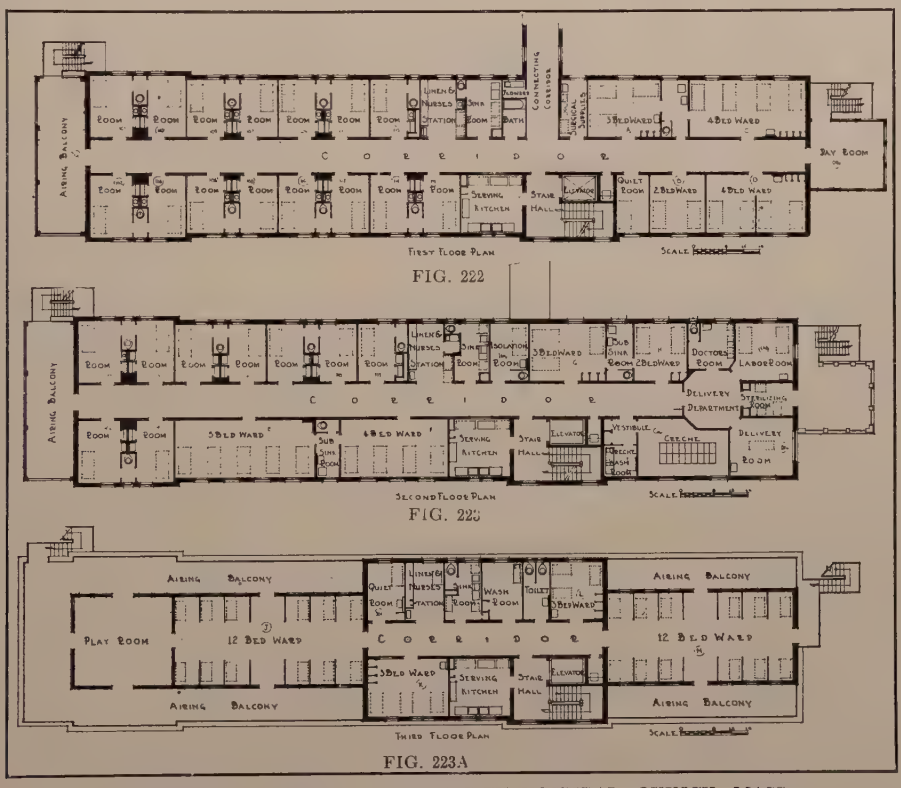



FIG. 222

FIG. 223

FIG. 223A

MATERNITY BUILDING, QUINCY CITY HOSPITAL, QUINCY, MASS.

FIG. 223B. OPEN AIR BALCONY OFF CHILDREN'S WARD, MATERNITY AND CHILDREN'S PAVILION, QUINCY CITY HOSPITAL, QUINCY, MASS.
Stevens & Lee, Architects

FIG. 223C. Children's Ward

FIG. 223D. Play Room

MATERNITY AND CHILDREN'S PAVILION, QUINCY CITY HOSPITAL, QUINCY, MASS.

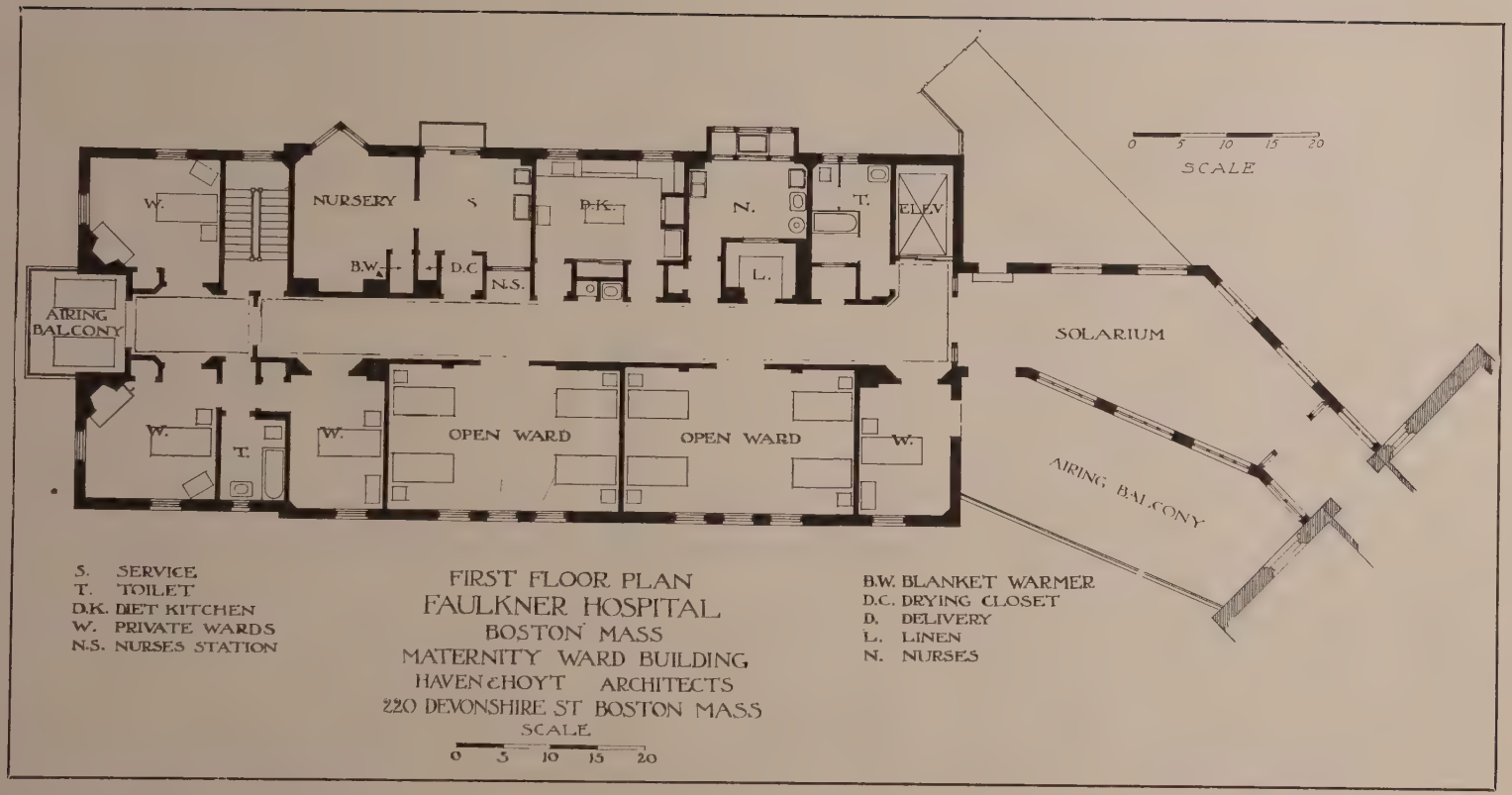

W.
NURSERY
S.
D.K.
N.
T.
ELEV.
B.W.
D.C.
N.S.
L.
AIRING BALCONY
SOLARIUM
W.
T.
W.
OPEN WARD
OPEN WARD
W.
AIRING BALCONY
0 5 10 15 20
SCALE
S. SERVICE
T. TOILET
D.K. DIET KITCHEN
W. PRIVATE WARDS
N.S. NURSES STATION
FIRST FLOOR PLAN
FAULKNER HOSPITAL
BOSTON MASS
MATERNITY WARD BUILDING
HAVEN & HOYT ARCHITECTS
220 DEVONSHIRE ST BOSTON MASS
SCALE
0 5 10 15 20
B.W. BLANKET WARMER
D.C. DRYING CLOSET
D. DELIVERY
L. LINEN
N. NURSES

FIG. 224

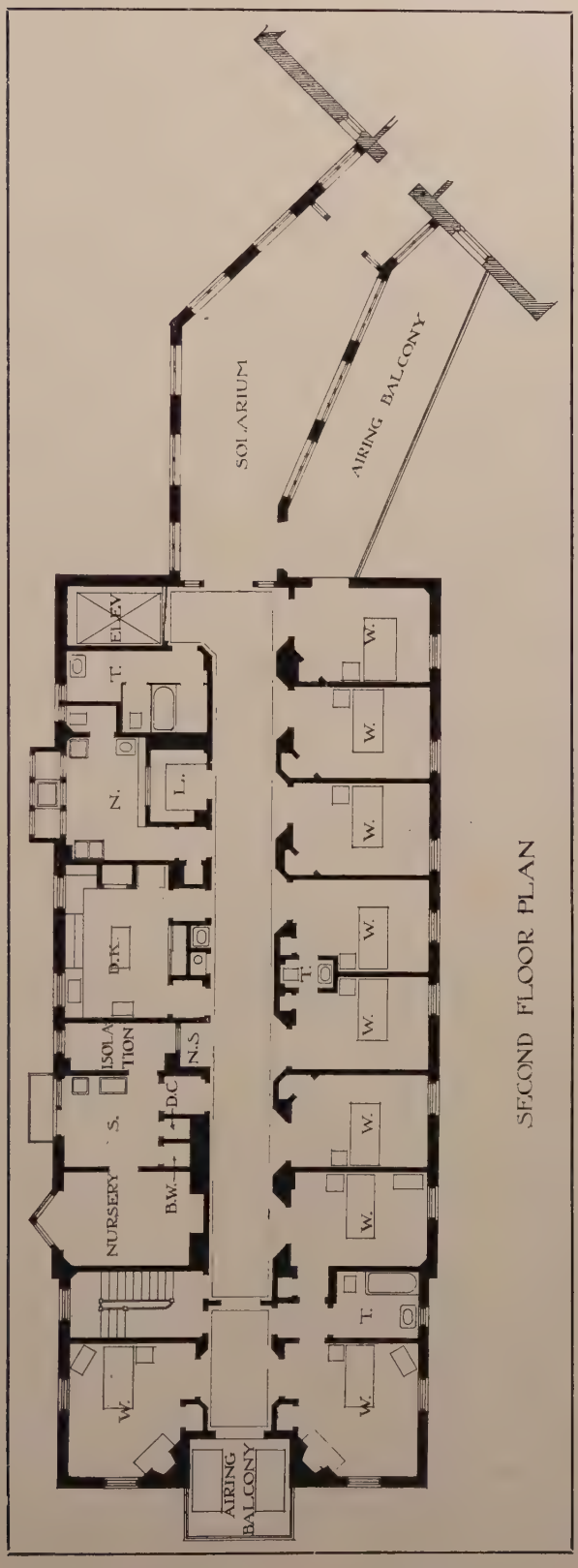



FIG. 225. MATERNITY DEPARTMENT, FAULKNER HOSPITAL, JAMAICA PLAIN, MASS.
Haven & Hoyt, Architects

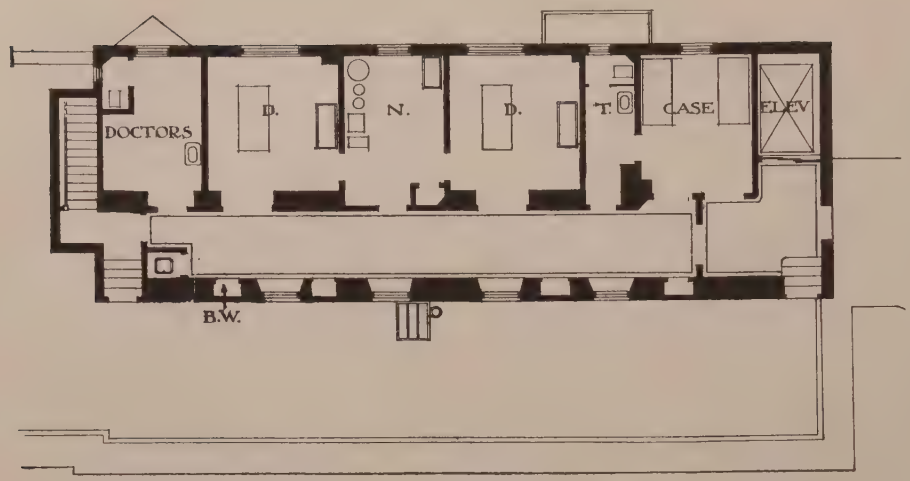



FIG. 226. DELIVERY ROOM FLOOR, MATERNITY DEPARTMENT, FAULKNER HOSPITAL, JAMAICA PLAIN, MASS.
Haven & Hoyt, Architects

plete than the NEW OBSTETRIC HOSPITAL for the UNIVERSITY COLLEGE HOSPITAL at London (Figs. 233A, 233B, 233C, 233D). The description is given by the architect.

This is a self-contained hospital unit, having its own receiving and out-patient departments, operating departments, kitchen offices, etc. The buildings are arranged so as to get the utmost possible amount of sunlight all round.

The basement contains the receiving and out-patient departments, kitchen offices, housekeeper's room, service, cold storage, etc., and has direct covered communication with the nurses' home and the main hospital by means of tunnels under the roadways.

The ground floor has the main entrance in the centre of the Huntley Street front, the right or north wing being devoted to the director's offices, and offices and rooms for health visitor, nurses, midwives, students, etc.

The whole of the south wing is occupied by a ward for obstetric cases with its bathroom, clinical laboratory and their adjuncts.

The main stairs, patients' lift, service room, etc., occupy the central portion of the building.

The first, second and third floors contain in the south wing three obstetric wards with sun balconies at the south end and three gynecological wards in the north wing. Each ward has its necessary accessories and service rooms. Nurseries and labor wards are arranged in the central part of each floor, and a specially large clinical laboratory on the third floor.

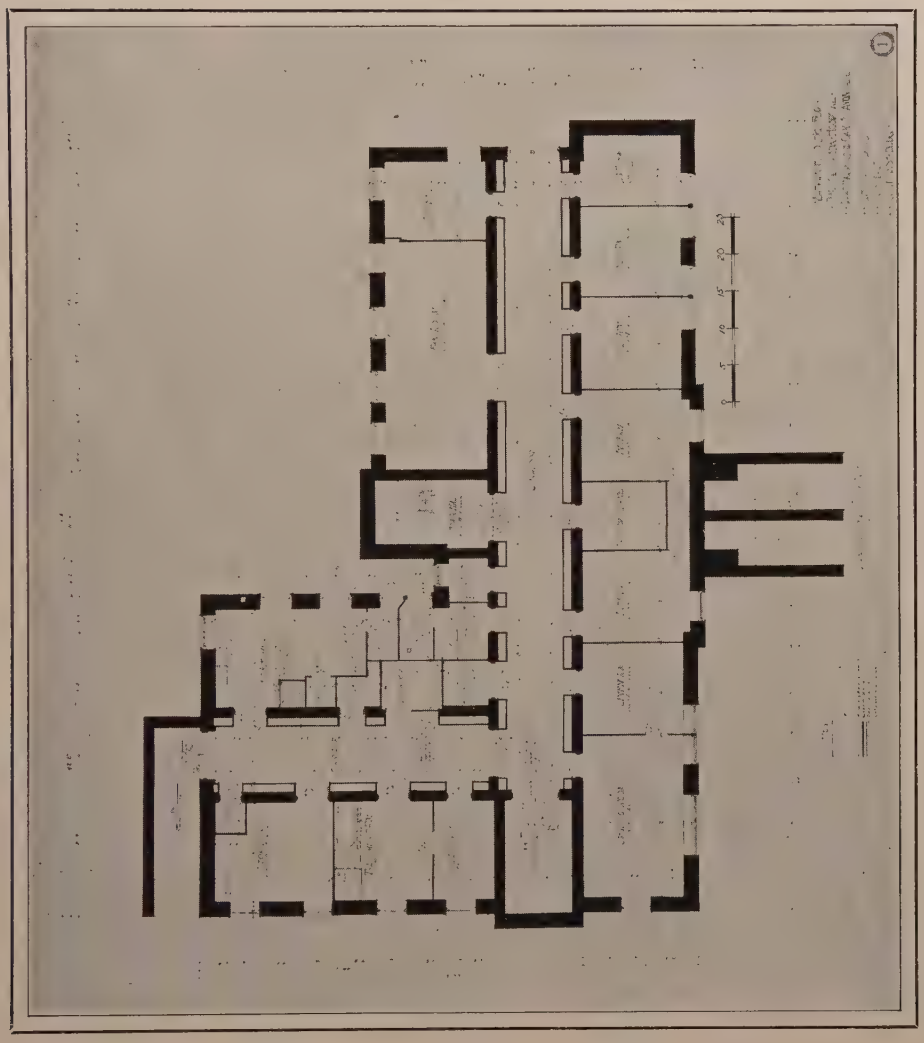


FIG. 227. BASEMENT PLAN, MATERNITY BUILDING, BETHESDA HOSPITAL, CINCINNATI, OHIO
Gustave W. Drach, Architect

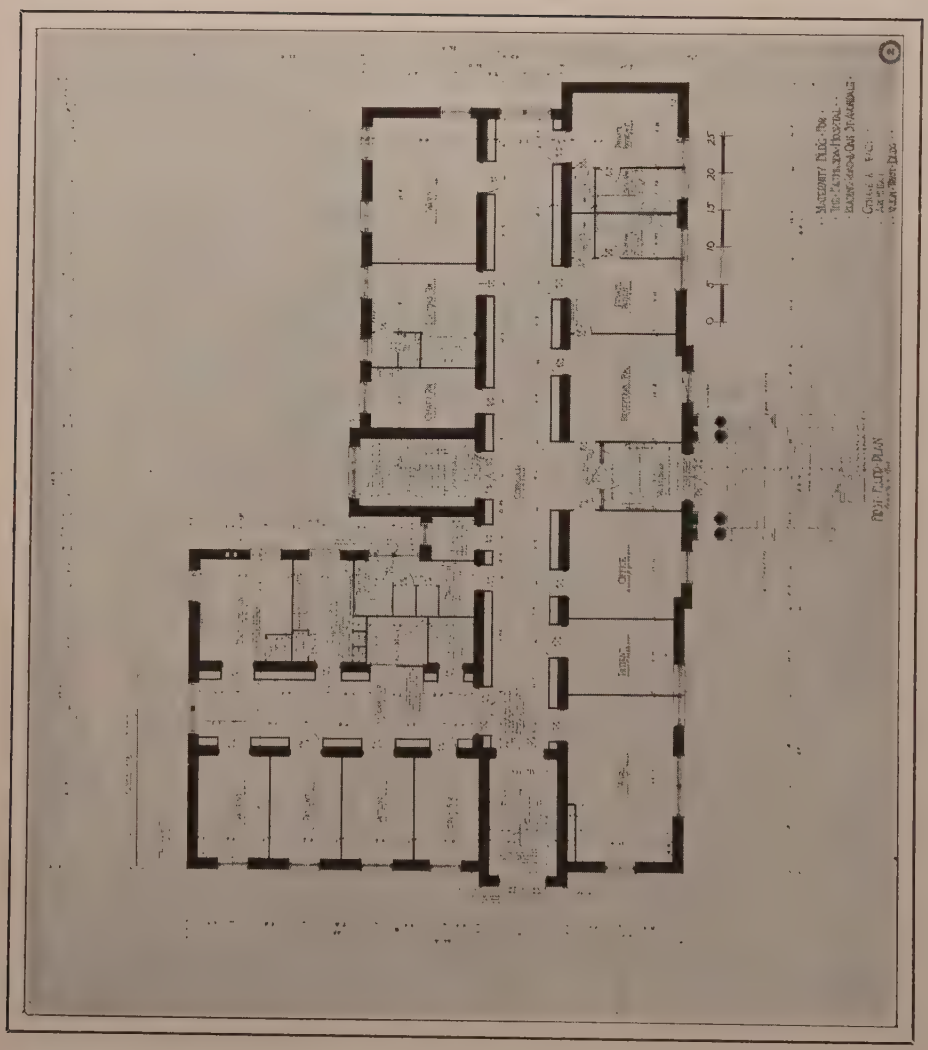


FIG. 228. FIRST FLOOR PLAN, MATERNITY BUILDING, BETHESDA HOSPITAL, CINCINNATI, OHIO
Gustave W. Drach, Architect

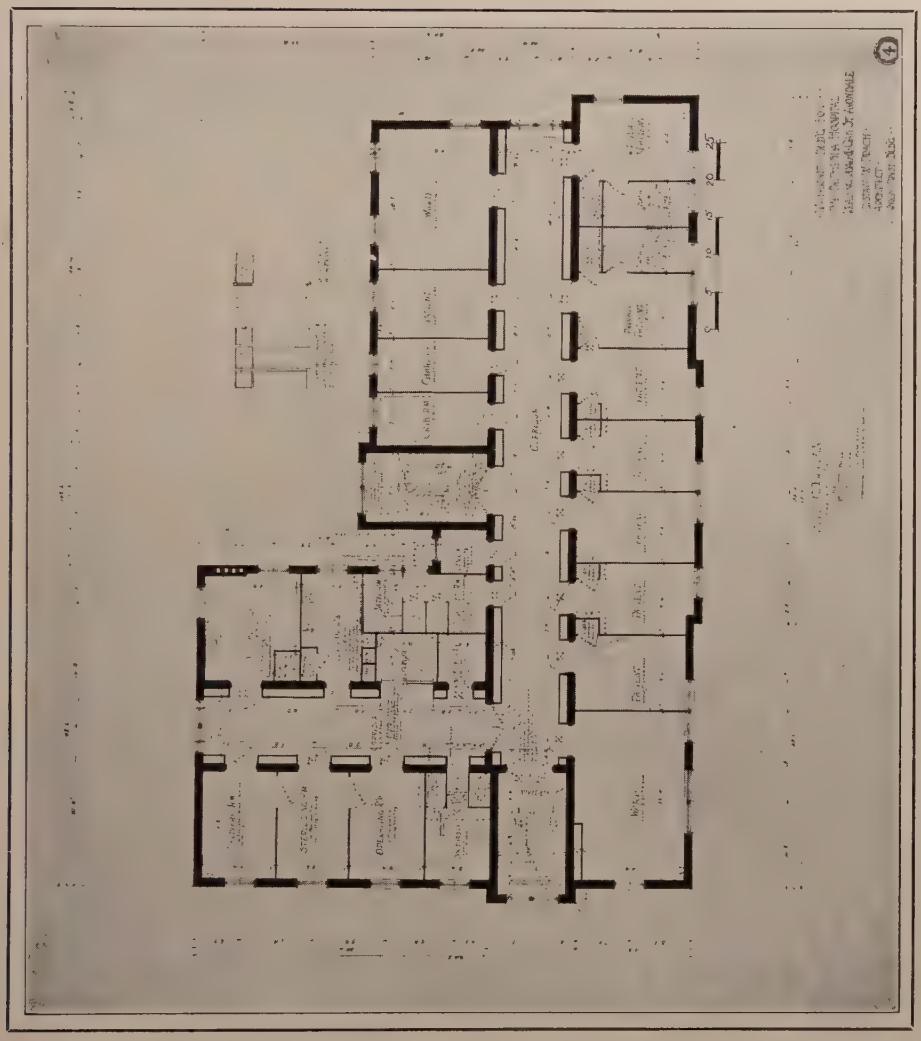
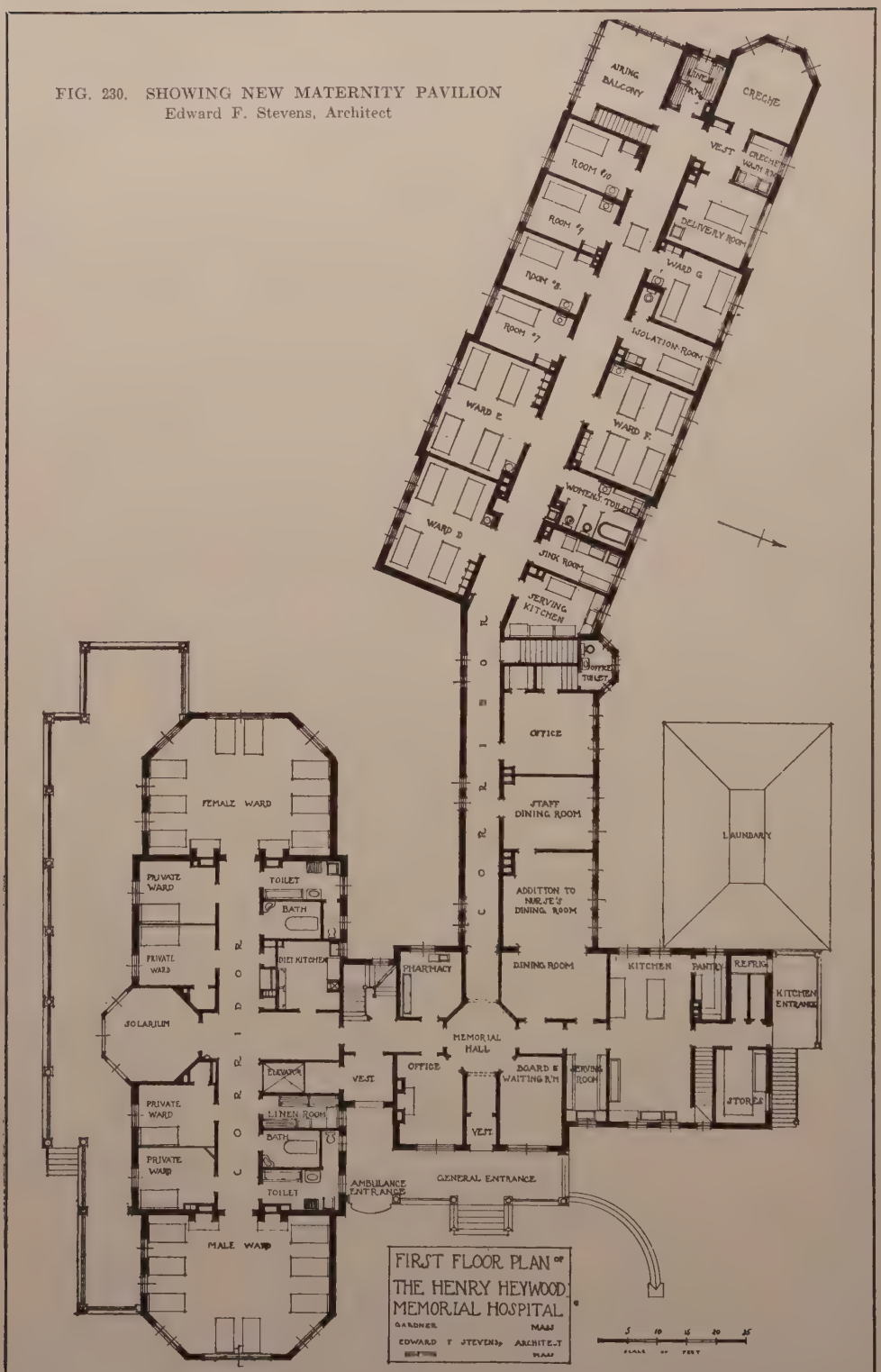


FIG. 229. THIRD FLOOR PLAN, MATERNITY BUILDING, BETHESDA HOSPITAL, CINCINNATI, OHIO
Gustave W. Drach, Architect

FIG. 230. SHOWING NEW MATERNITY PAVILION
Edward F. Stevens, Architect



On the fourth floor, the south wing is occupied by another obstetric ward with its sun balcony, etc., while the whole of the north wing is given over to the operating department with its theatre, anesthetizing and recovery rooms, surgeons' and dressers' rooms, etc. The center portion contains nursery, labor ward, service room, etc.

FIG. 231. GROUND FLOOR PLAN (CHILDREN'S DEPARTMENT), HENRY HEYWOOD MEMORIAL HOSPITAL, GARDNER, MASS.
Edward F. Stevens, Architect

On the fifth floor are large clinical laboratories, an observation ward, three isolation wards, and a large solarium, easily reached from the patients' lift and having a spacious roof-flat adjoining on which the patients can be readily taken in their beds.

The hospital accommodates 84 patients.

All the large wards have double stoves, placed centrally, having the flues concealed in the thickness of the floors. There is also secondary heating by means of the panel hot water system, all pipes being concealed in the ceilings and walls.

The residents' quarters occupy the northern portion of the site, and are in direct connection with the hospital by means of the tunnels previously referred to. The main entrance is in University Street.

Accommodation is provided for 20 resident medical officers, each

FIG. 232. ROOM FOR PREMATURE BABIES, WILHELMINA HOSPITAL, VIENNA, AUSTRIA

with a bedroom and a sitting-room, and for 16 students. The chief rooms have fireplaces and all have panel heating. There is a suite of rooms for the resident physician, a large and a small common room and a dining-room with service, etc., and separate kitchen department.

The chief elevations are faced with cherry-red facing bricks relieved with some stone work.

The roofs are covered with green Westmoreland slates.

The floors and roofs are of fireproof construction.

FIG. 233. PREMATURE ROOM, CHILDREN'S HOSPITAL, WASHINGTON, D. C.

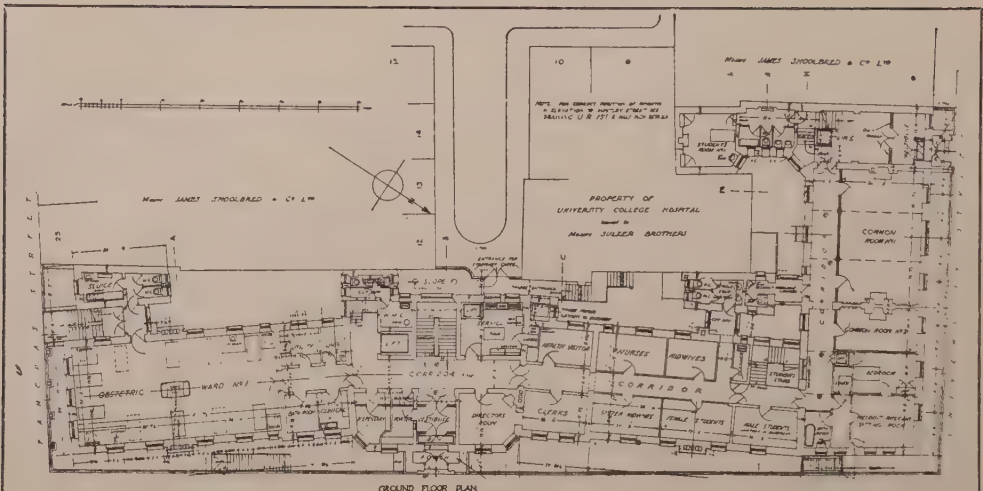



FIG. 233A

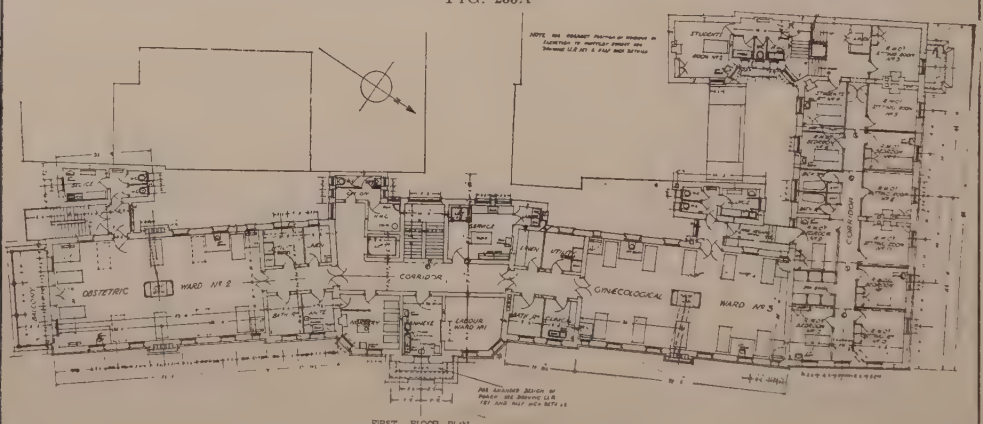



FIG. 233B

FIG. 233C

OBSTETRIC HOSPITAL, UNIVERSITY COLLEGE HOSPITAL, LONDON, ENG.
George Hornblower, F. R. I. B. A., Architect

FIG. 233D. Exterior, Obstetric Hospital
UNIVERSITY COLLEGE HOSPITAL, LONDON, ENG.
George Hornblower, F. R. I. B. A., Architect

The maternity department of the Ottawa Civic Hospital, Ottawa, Canada (Fig. 87), has sixteen small wards, twenty-six private rooms, two delivery rooms (for private and for ward patients), a labor room and three nurseries. Ample utilities facilitate service. A good isolation department is provided. The delivery rooms occupy what is in effect a wing by itself.

The maternity department of the Faulkner Hospital, Jamaica Plain, Massachusetts (Figs. 224, 225 and 226), presents an interesting method of saving floor space and therefore cost. The width of the corridors is reduced, and by using a splayed door jamb additional room is secured for the turning of stretchers or beds in the hall. This splayed space is utilized in the rooms for closets.

The delivery rooms are on the third floor, and their floors are sound-proofed. Special features are: the bay window in the nursery, which gives additional sunlight; the blanket warmer and drying closet; the oriel from the nurses' utility room, which gives opportunity for the care of flowers at night in a temperature lower than that of the room; the special rooms at the end of the building, which can easily be isolated if desired.

The maternity building of the Bethesda Hospital, Cincinnati, Ohio (Figs. 227, 228 and 229), has in its basement comfortable rooms

for internes, and a good hydrotherapeutic department. On the first floor are the offices and reception room, with wards and private rooms for patients. The utilities are situated in the angle of the building. On the second floor are both wards and rooms for patients; the delivery and operating rooms are shut off from the rest of the floor; there is a sterilizing room and a doctors' room in connection with them.

For smaller units in private hospitals see plans of MACON HOSPITAL (Fig. 115), MELROSE HOSPITAL (Fig. 414), the GOOD SAMARITAN HOSPITAL, Sandusky, Ohio (Fig. 427), and the addition to the HEYWOOD HOSPITAL, Gardner, Massachusetts (Figs. 230 and 231).

Several authorities urge the provision of a small room which can be superheated, for premature babies. Fig. 232 shows such a room. BELLEVUE HOSPITAL, New York, N. Y., has a similar room, large enough for ten cribs.

The CHILDREN'S HOSPITAL of the District of Columbia (Fig. 233) has two premature rooms, with three cubicles in each; this provides for different temperatures and for colored and white.

# CHAPTER VIII

## THE CHILDREN'S DEPARTMENT

IN planning for a children's hospital or a children's department of a general hospital we have new conditions that do not exist in any of the other departments. We are dealing with suspicious cases, where the only logical treatment is to consider every case as having been exposed to some communicable disease and to provide proper isolation for the study of every new patient. To that end the admitting department should have a sufficient number of subdivisions so that each case may be temporarily isolated until a careful diagnosis

FIG. 234. CHILDREN'S WARD, ST. THOMAS HOSPITAL, LONDON, ENG.

can be made. During the usual period of incubation the children should be placed in an observation ward, with the beds so separated by screens, or otherwise, as to prevent the contact of one patient with another. These screens may be made of glass, or glazed cubicles can be provided that will give segregation and the necessary isolation.

Where a children's department is placed in a general hospital, be the department ever so small, it should be separated from that portion of the hospital occupied by adults, which should be assured freedom from the noises coming from the children's ward and safety from the danger of infection.

The necessity of providing private rooms is not so great in the children's hospital as in the adults', for it is found that children are much happier if they can be with others, as their attention is taken

FIG. 235. FORSYTH DENTAL INFIRMARY, BOSTON, MASS. CERAMIC FRIEZE IN WAITING ROOM

from themselves, and they are likely to forget their own discomfort. Even in the general wards, however, outside of the observation ward, a certain segregation or grouping is desirable. A glass screen partition between every three or four beds gives a sufficient amount of separation, but it is not desirable to have wards larger than from sixteen to twenty beds.

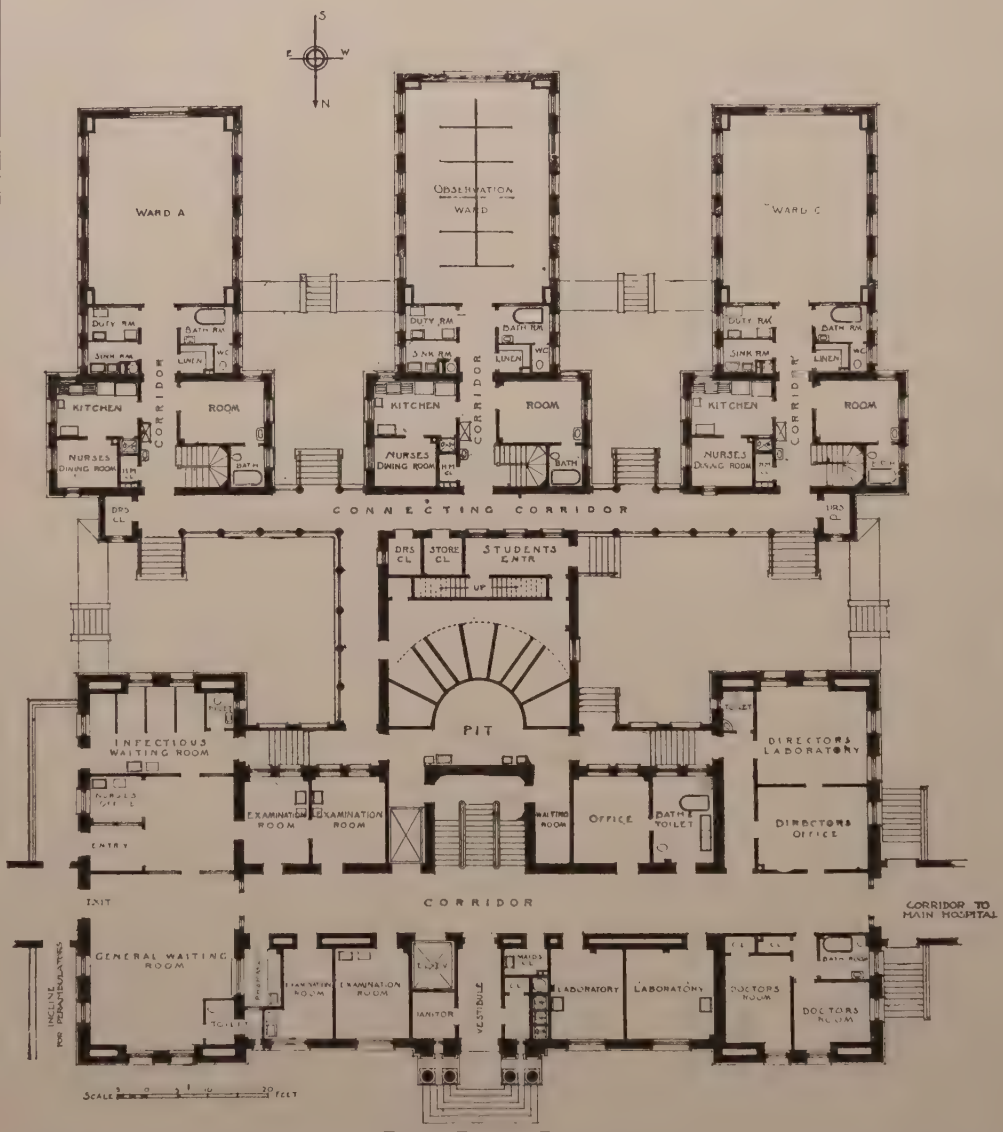
As with the adult, every ward unit should be supplied with one or two quiet rooms for the very sick. These rooms can be glazed so that the nurse from the corridor may watch the patient without the necessity of entering the room.

One of the essentials in a children's ward unit is the day room or play room, for in this the little convalescents are freer to romp as much as their infirmities will allow and to gather what comfort they can from the toys furnished them. The floor covering of this room should be some warm material—linoleum or cork carpet, for instance, or even cork tile.

The serving kitchen and sink room should be very little different from those provided for the adult ward units. The toilet and bath facilities, however, should be entirely different. The waterclosets should be low and easily accessible, as also should the wash basins. For bathing, the shallow tub or slab tub affords the most convenient method of washing children. Without undue effort on the part of the attending nurse the children can be washed in clean running water through a spray attached to a rubber hose. The temperature of the water can be controlled either by a control device or by a large stor-

FIG. 236. Children's Playroom

FIG. 237. Children's Ward




FIRST FLOOR PLAN

FIG. 238. HARRIET LANE HOME FOR INVALID CHILDREN, JOHNS HOPKINS HOSPITAL, BALTIMORE, MD.

Wyatt & Nolting, Butler & Rodman, Associated Architects

age tank placed directly above the bathing slab. By using this method the patient is never washed in dirty or poisoned water, as is the case in bathing in a filled tub. (See Chapter XVIII, "Plumbing.") In this bathing room should be placed a cabinet for the toilet articles of each individual child. This should be divided into compartments and should contain the usual mug, tooth brush, comb, and hair brush.

The prevalence of contagious diseases in a children's hospital is so much greater than in the hospital of the adult that it is desirable to have a section of the hospital planned and set apart for the care of such diseases. This department should be treated the same as the con-

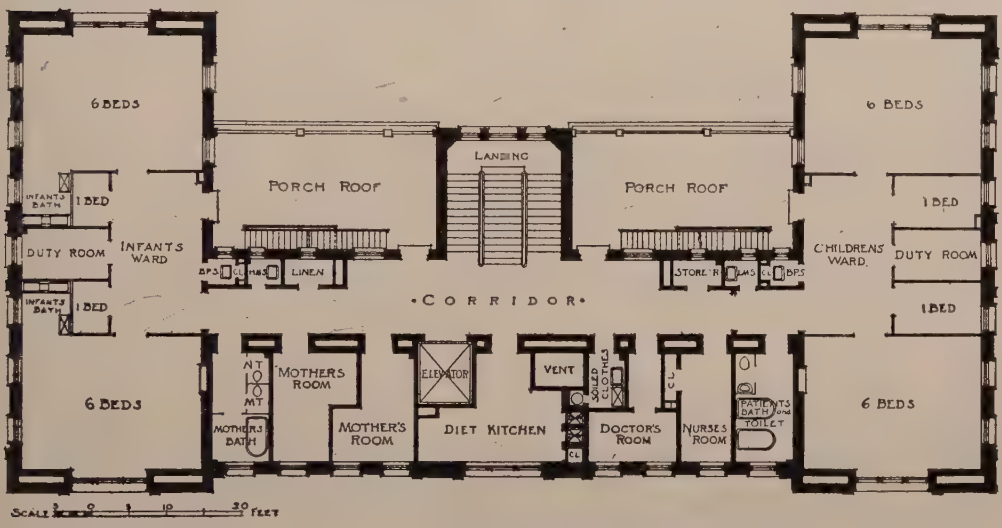



FIG. 239. HARRIET LANE HOME FOR INVALID CHILDREN, JOHNS HOPKINS HOSPITAL, BALTIMORE, MD.
Wyatt & Nolting, Butler & Rodman, Associated Architects

tagious hospital—that is, there should be a certain number of cubicles or rooms where each individual bed is screened, and the same care maintained in the treatment of cases as in the contagious hospital.

Here the orthopedic service is, as a general thing, greater than in the hospital for adults, and it is decided economy, if the hospital is large, to have a department for the manufacture of corrective apparatus; this is well illustrated in the Hospital for Sick Children in Toronto and in the Ruptured and Crippled Children's Hospital in New York.

The requirements for operating rooms and surgical dressing rooms do not differ from those described in the chapter on the ward unit.

Dr. McLean of the Babies' Hospital, New York, regards the following as essential in a children's hospital or department: (1) Bal-

FIG. 240. ISOLATION PAVILION, SICK CHILDREN'S HOSPITAL

conies or roof space for two-thirds of the patients. (2) Isolation rooms for communicable diseases, respiratory cases and meningitis cases. (3) For babies, he urges a warm room with cubicles and humidity control.

He advocates the cubicle system for all wards, not only as a means of limiting infections, but on account of drafts, which he considers a menace to babies.

The question of color and decoration is one which requires careful study. The children can sometimes be quieted more easily by pictures on the walls than in any other way. Simple illustrations from Mother Goose, stenciled at a convenient height for the children to look at, is one way of providing for this. One of the most attractive

FIG. 241. PASTEURIZING ROOM, HOSPITAL FOR SICK CHILDREN, TORONTO, CANADA

FIG. 242. CHILDREN'S WARD, MELROSE HOSPITAL, MELROSE, MASS.

wards which the writer has ever seen was in the children's department of the ST. THOMAS HOSPITAL in London (Fig. 234). Here the walls were lined the entire height with tiles depicting interesting incidents in child life. The admitting room of the FORSYTH DENTAL CLINIC (Fig. 235) in Boston is an example of ceramic decoration. Figs. 236 and 237 are also examples.

A few examples of children's hospitals and departments will serve to illustrate some of the points which are mentioned.

In the children's clinic of the DUSSELDORF HOSPITAL, at the entrance is a small hospital isolation department of four beds, for the observation of doubtful cases. The ground floor is for the accommodation of infants and has an interesting incubator department consisting of six cells or tiny rooms, each for two cots. The lower portion of these is constructed of marble and the upper of two layers of glass, with elaborate apparatus for controlling the temperature, humidity and ventilation of each cell from the corridor. The utensils are contained in glazed compartments at the head of each bed. The first floor of the clinic contains the wards for the older children.

FIG. 243. CHILDREN'S WARD, MATERNITY BUILDING, BRIDGEPORT HOSPITAL, BRIDGEPORT, CONN.

The Harriet Lane Home for Invalid Children (Figs. 238 and 239) (the children's department of the Johns Hopkins Hospital) is worked out most carefully to provide for the proper observation and segregation. This plan consists of the main building, with three small ward units. The patient enters through the main admitting room, with the examining rooms adjoining. Suspicious cases are admitted through what is termed the infectious waiting-room, and one of the three wards provided is for observation purposes. In this, each bed is screened from its neighbor by a close glass and metal screen. Each of these ward units contains a duty room, sink room, bath room, isolation room, and a serving kitchen with nurses' dining-room adjoining.

Perhaps no children's hospital in this part of the world is doing greater work than The Hospital for Sick Children, at Toronto, which administers more to poor children than to the children of the rich, both in the outdoor and in the indoor departments, as well as in the summer Lakeside Home.

The isolation building (Fig. 240) of this group is planned particularly for the care of an epidemic and for small children. It is

FIG. 244. DAY ROOM IN CHILDREN'S WARD, BRIDGEPORT HOSPITAL, BRIDGEPORT, CONN.

FIG. 245. CHILDREN'S BUILDING, WORCESTER CITY HOSPITAL, WORCESTER, MASS.
Fuller & Delano, Architects

designed on the principle of the Pasteur Hospital in Paris, and will be described in detail in the chapter on contagious hospitals. It provides for absolute isolation of suspected cases, or contagious cases as they develop. A separate entrance, separate elevator, and a separate corps of nurses are provided for this section of the hospital.

One department of this hospital which probably no other hospital of its size has is the complete plant for the pasteurization and modification of all milk, not only for the hospital, but for a very large outpatient distribution. This department has the most modern, up-to-date equipment. (Fig. 241.)

Two or three examples of children's departments in general hospitals will illustrate some of the points suggested in the preceding paragraphs.

In a small hospital in Melrose, Massachusetts (Fig. 415), the children's department, although very small, is separated from the main corridor by two glazed doors. The ward (Fig. 242) is connected with a large outside airing balcony, and is provided with special children's toilet, and a small isolation room with glazed walls for better observation is provided.

In the children's department of the Bridgeport Hospital (Fig. 243), Bridgeport, Connecticut, eighteen children are cared for in the main ward. This ward is subdivided by glazed screens into groups of four or five beds each, the glazed screens permitting perfect supervision. A small isolation room is provided for one or two more

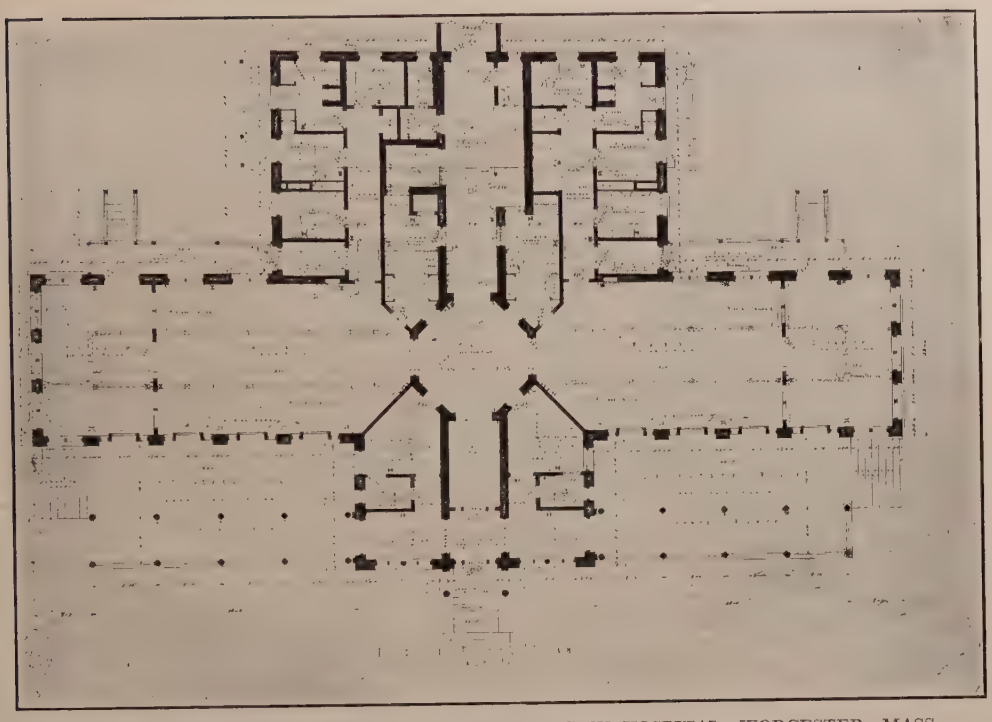


FIG. 246. CHILDREN'S BUILDING, WORCESTER CITY HOSPITAL, WORCESTER, MASS.
Fuller & Delano, Architects

patients. A large, well-lighted day room (Fig. 244), ample airing balcony, and complete service rooms, including serving kitchen, sink room, surgical dressing room, bathing room and toilets, are provided.

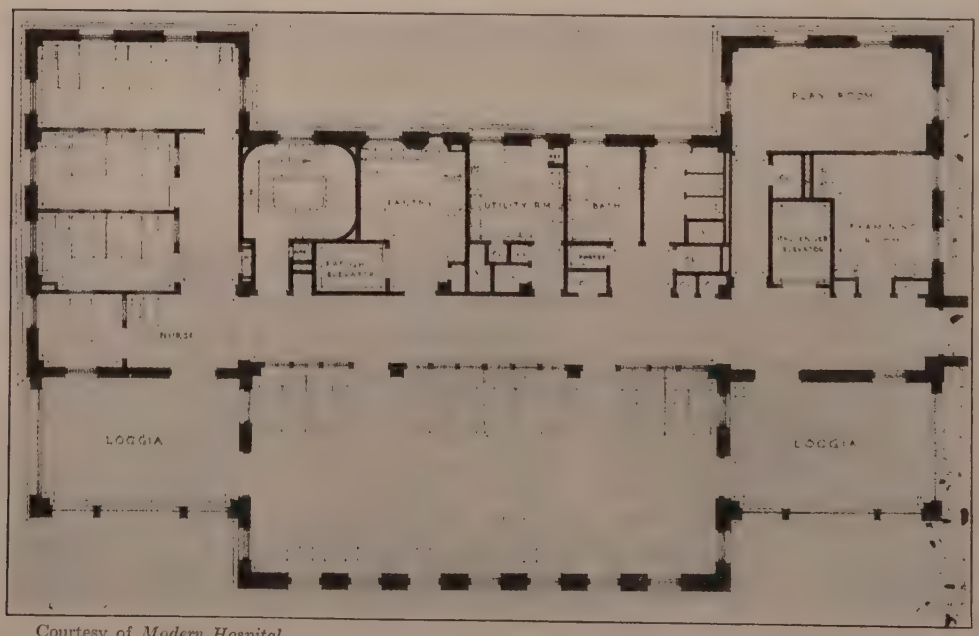
The simple decoration on the walls of the main children's ward, depicting mountain scenery, and a large memorial window add to the color effect of this department.

Adjoining the children's department is a small infectious department, consisting of two isolation rooms and an isolation toilet. This isolation department, while adjoining the children's department, can be entirely shut off and served from a cross corridor connecting with the admitting department. (See Fig. 192.)

Another good example of a children's ward building is shown in the plans of the children's pavilion of the Worcester City Hospital (Figs. 245 and 246). The wards, the private rooms, and the utilities are grouped around a central rotunda in such a way that surveillance is easily kept of every portion of the floor. Here the natural system of ventilation is used—i. e., ventilating the entire wards from the center of the ceiling, which slopes at an angle of at least thirty degrees. This construction is well hidden in the exterior treatment.

Courtesy of *Modern Hospital*

FIG. 247. EXTERIOR, CHILDREN'S BUILDING, MT. SINAI HOSPITAL, NEW YORK, N. Y.




Courtesy of *Modern Hospital*

FIG. 248. PLAN, CHILDREN'S BUILDING, MT. SINAI HOSPITAL, NEW YORK, N. Y.
Arnold W. Brunner, Architect; S. S. Goldwater, M. D., Consultant

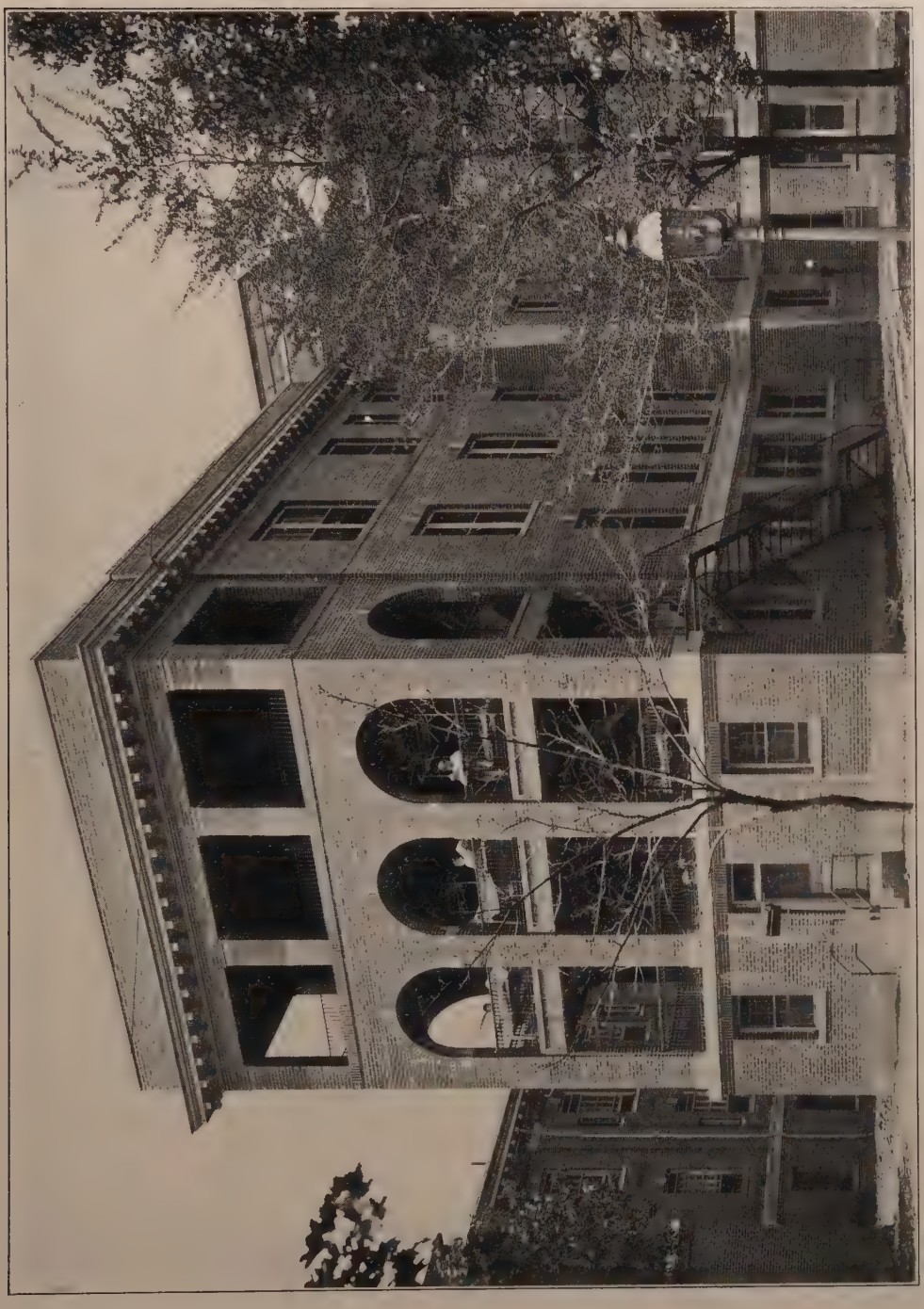


FIG. 249. EXTERIOR, CHILDREN'S HOSPITAL OF THE DISTRICT OF COLUMBIA, WASHINGTON, D. C.
Stevens & Lee, Architects; Lynch Luquer, Associated Architect

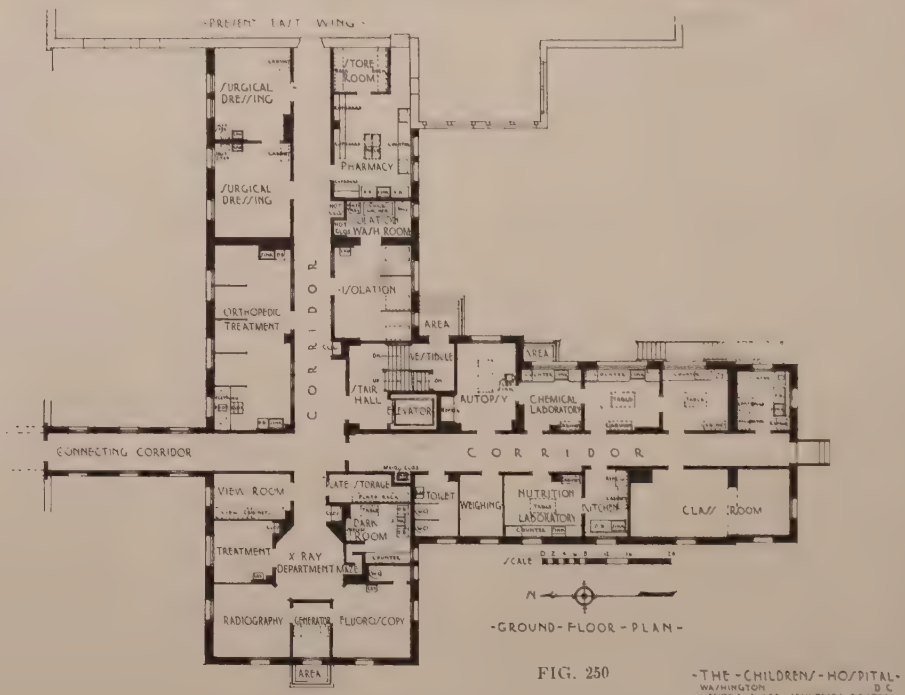



FIG. 250

-THE-CHILDREN/-HO/PITAL-
WA/HINGTON D C
/EVER/ & LEE ARCHITECT/ BO/TON
LYNCH LUQUER A//OC AGENT WA/HINGTON D.

FIG. 251

-THE-CHILDREN/-HO/PITAL-
-WA/HINGTON D C
/IVER/ & LEE ARCHITECT/ BO/TON
LYNCH LUQUER A//OC AGENT WA/HINGTON D.C.

CHILDREN'S HOSPITAL OF THE DISTRICT OF COLUMBIA, WASHINGTON, D. C.

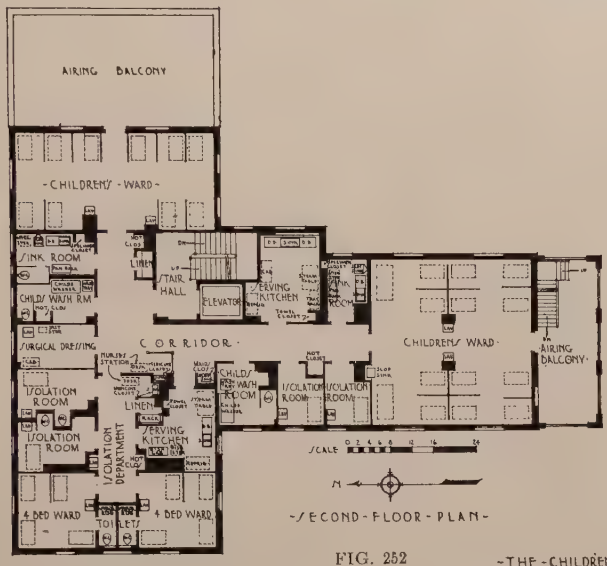



FIG. 252

-THE - CHILDREN'S - HOSPITAL -
WASHINGTON D C
STEVENS & LEE ARCHITECTS BOSTON
LYNCH LUQUER ASSOC ARCHTS WASHINGTON D C

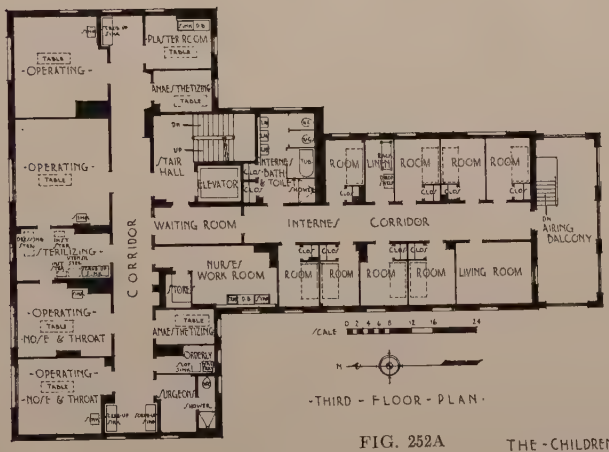



FIG. 252A

THE - CHILDREN'S - HOSPITAL -
WASHINGTON D C
STEVENS & LEE ARCHITECTS BOSTON
LYNCH LUQUER ASSOC ARCHTS WASHINGTON D C

CHILDREN'S HOSPITAL OF THE DISTRICT OF COLUMBIA, WASHINGTON, D. C.

FIG. 253. CUBICLE WARD, CHILDREN'S HOSPITAL OF THE DISTRICT OF COLUMBIA

The children's building of Mt. Sinai Hospital, New York City (Figs. 247 and 248), is so planned as to give light and air to all rooms, despite its location on a crowded city site. There are four floors, each accommodating twenty-five patients. Each floor has a playroom, and two loggias which are used as outdoor wards. There is also a roof playroom, attractively equipped. The partitions of wards, both large and small, are of glass, to enable the nurses to keep all patients easily under observation. One-half of the beds are in cubicles, permitting isolation of new cases. The nurses' station commands all the wards and is in sight of visitors. There are many closets, including drying and warming closets. This is a very carefully worked out plan.

The ward building for white children at the Children's Hospital of the District of Columbia (Figs. 249-254) provides on its first floor for medical cases and babies. It is divided into small units, so as to facilitate classification. Cubicles are provided for isolation of new cases, and there are "quiet" rooms for special patients. The nurses' station commands a view of the whole floor and is convenient for visitors. There are drying and warming closets, ventilated. Two

FIG. 254. Nurses' Station and Medicine Case
CHILDREN'S HOSPITAL OF THE DISTRICT OF COLUMBIA

incubator rooms provide for premature babies to be kept at different temperatures. The second floor is for surgical cases; the wards all have cubicles. There are ample airing balconies. Here is a special isolation department for cases such as erysipelas, vaginitis, etc., with both wards and single rooms, each self-contained, so that each room may accommodate a different infection. The third floor has the operating department for the whole hospital on the north, the south wing being internes' quarters.

The children's building of ST. LUKE'S HOSPITAL, New Bedford, Massachusetts (Figs. 255-256D), is a long, straight building, connected by a corridor with other buildings. Near the entrance corridor

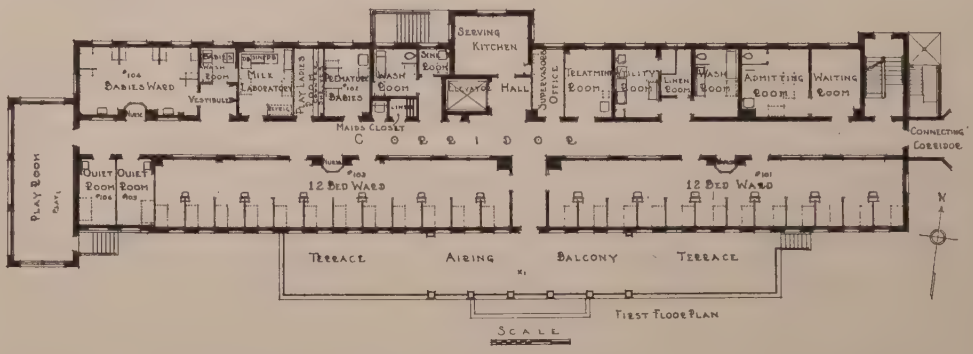



FIG. 255. CHILDREN'S BUILDING, ST. LUKE'S HOSPITAL, NEW BEDFORD, MASS.

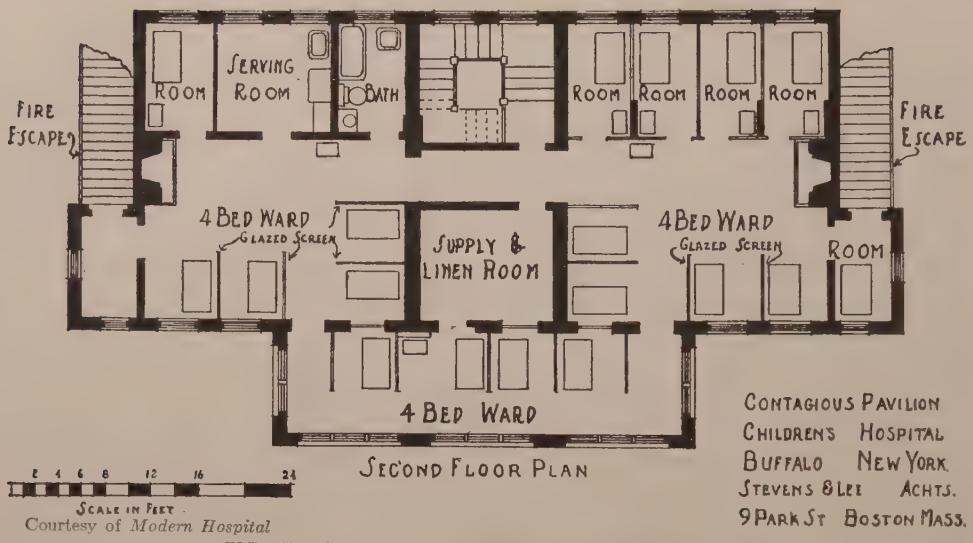
FIG. 256. CHILDREN'S BUILDING, ST. LUKE'S HOSPITAL, NEW BEDFORD, MASS.

FIG. 256A. EXTERIOR, CHILDREN'S BUILDING, ST. LUKE'S HOSPITAL, NEW BEDFORD, MASS.
Stevens & Lee, Architects

FIG. 256B. PLAY ROOM, CHILDREN'S PAVILION, ST. LUKE'S HOSPITAL, NEW BEDFORD, MASS.

FIG. 256C. BABIES' WARD, CHILDREN'S PAVILION, ST. LUKE'S HOSPITAL, NEW BEDFORD, MASS.

FIG. 256D. TWELVE-BED WARD, CHILDREN'S PAVILION, ST. LUKE'S HOSPITAL, NEW BEDFORD, MASS.
Stevens & Lee, Architects




Courtesy of *Modern Hospital*

FIG. 257. CHILDREN'S HOSPITAL, BUFFALO, N. Y.

Courtesy of *Modern Hospital*

FIG. 258. CUBICLE WARD, CHILDREN'S HOSPITAL, BUFFALO, N. Y.

on the first floor is the admitting department. On the first floor are two twelve-bed wards, a baby ward and a premature room; on the second floor are two- and three-bed wards and private rooms. All wards are divided into cubicles, for maintaining isolation technique, and are provided with lavatories between each alternate cubicle. Central utilities, surgical dressing rooms, supervisor's room, and centrally located nurses' stations are provided. There is a play-room on each floor and an airing balcony. On the first floor

is a milk laboratory. On the ground floor are locker and dressing-rooms for special nurses, also dining-room.

Attention is called to the children's department of the QUINCY CITY HOSPITAL (Figs. 223A-223D), which is described in Chapter VII.

The admitting department of the CHILDREN'S HOSPITAL of Buffalo, New York (Figs. 257-259), shows both single rooms and cubicle wards, arranged so as to afford isolation for every patient who enters. They are transferred from here after a proper period to other sections of the hospital.

Courtesy of *Modern Hospital*

FIG. 259. CUBICLE WARD, CHILDREN'S HOSPITAL, BUFFALO, N. Y.

In the plans for the HOSPITAL FOR RUPTURED AND CRIPPLED (Figs. 263-265), New York City, a most comprehensive scheme is carried out. This service is largely for children and the planning is simple and straightforward. The out-patient section, consisting of thoroughly equipped rooms and departments, is entered on the left of the center, while a corresponding entrance on the right enters the executive department.

In the basement are the kitchen, the laundry, the heating plant, the brace shop, and storage for supplies.

On the first floor are the out-patient department and the administration department.

The second floor contains the living quarters for the superintendent, staff, housekeeper and graduate nurses.

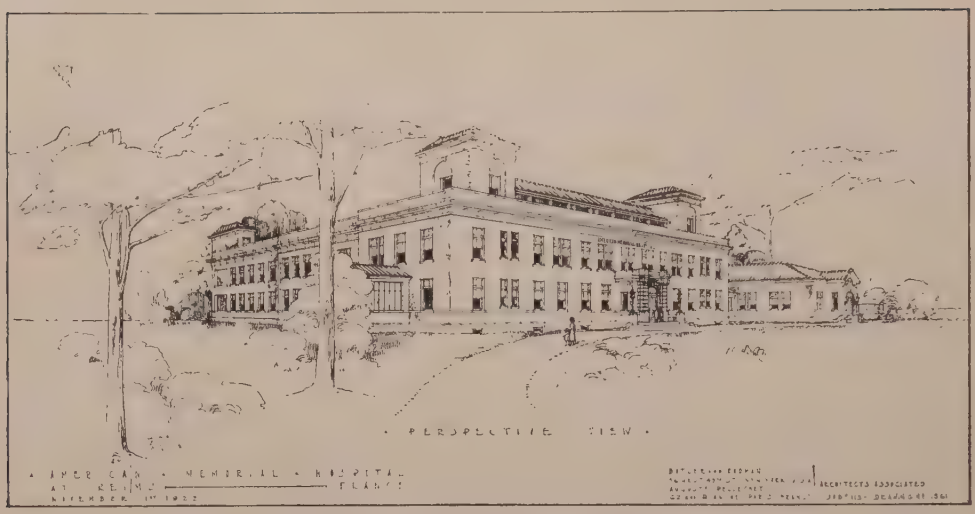



FIG. 260. AMERICAN MEMORIAL HOSPITAL, REIMS, FRANCE

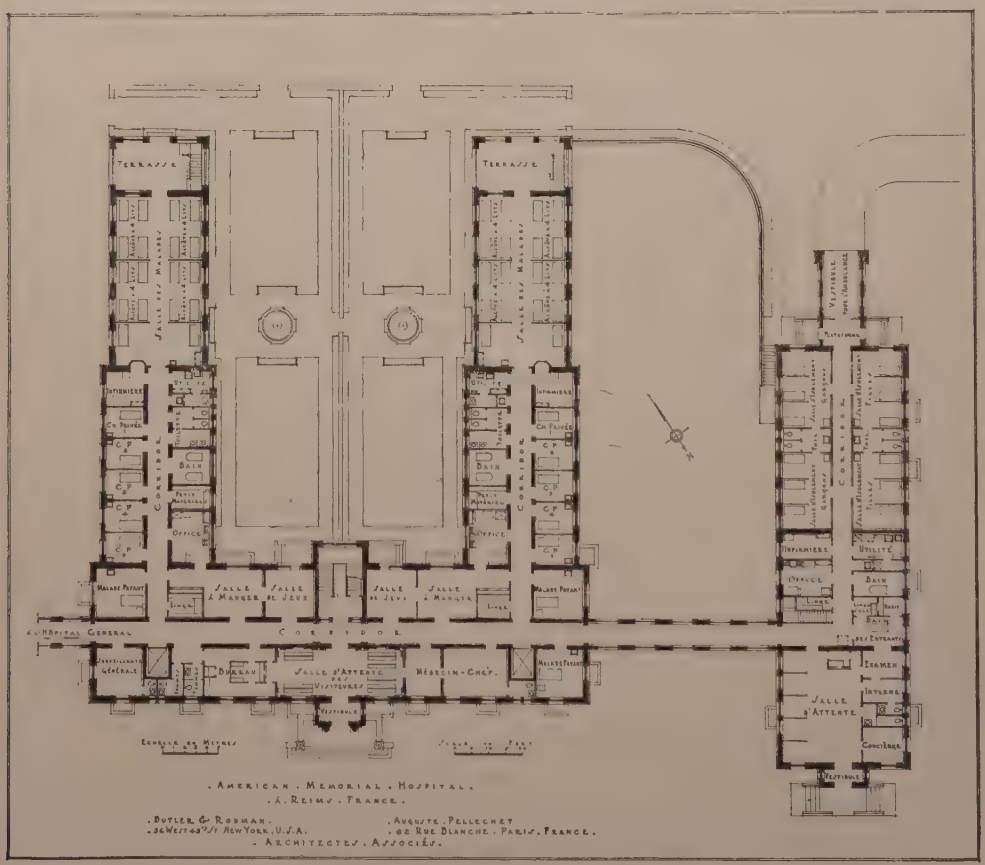



FIG. 261. PLAN, AMERICAN MEMORIAL HOSPITAL, REIMS, FRANCE
Butler & Rodman, N. Y., Auguste Pellechet, Paris, France, Architects Associated

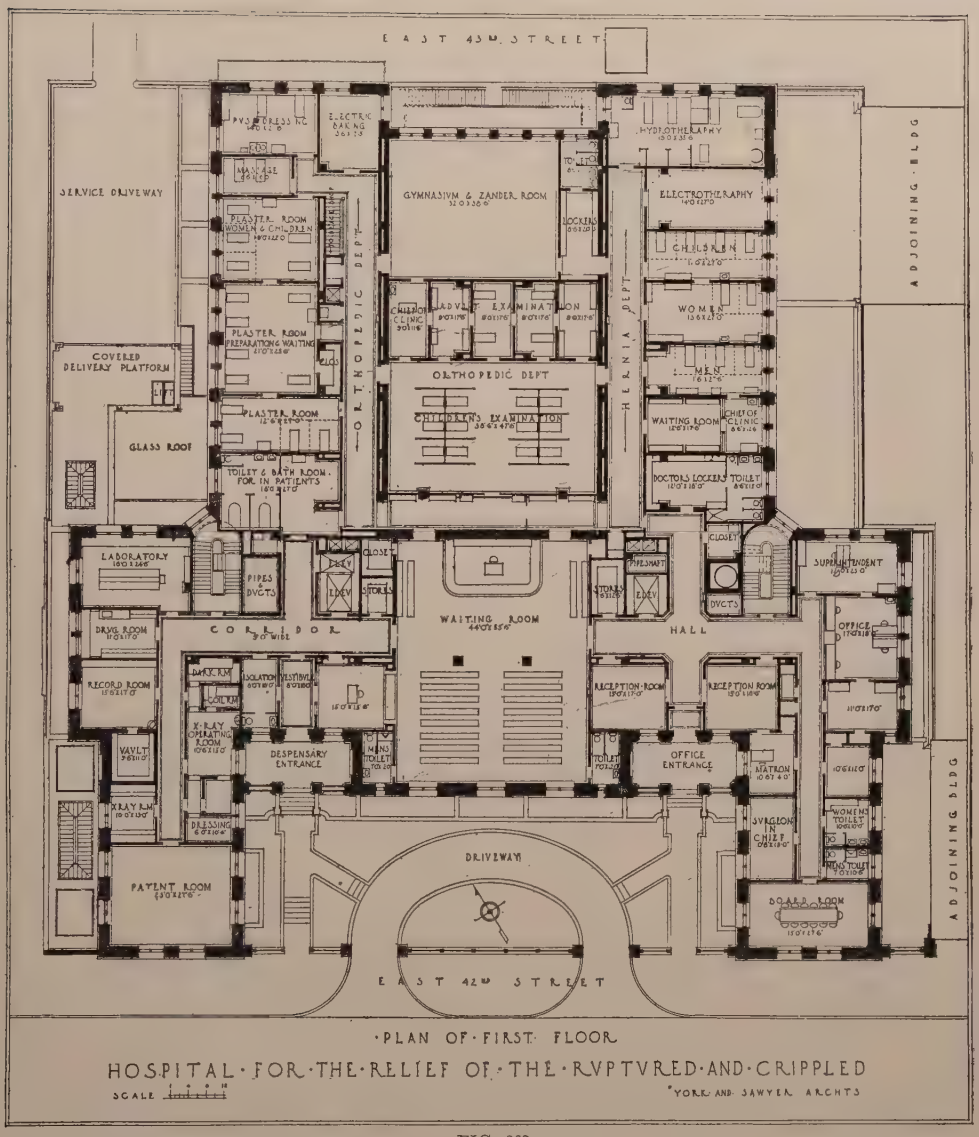

EAST 43RD STREET
SERVICE DRIVEWAY
COVERED DELIVERY PLATFORM
GLASS ROOF
GYMNASIUM & ZANDER ROOM
ORTHOPEDIC DEPT
HERNIA DEPT
HYDROTHERAPHY
ELECTROTHERAPHY
CHILDREN
WOMEN
MEN
WAITING ROOM
CHIEF OF CLINIC
DOCTORS LOCKER & TOILET
ADJOINING BLDG
LABORATORY
CORRIDOR
WAITING ROOM
HALL
SUPERINTENDENT
OFFICE
RECEPTION ROOM
RECEPTION ROOM
OFFICE ENTRANCE
MATRON
SURGEON IN CHIEF
WOMENS TOILET
MENS TOILET
BOARD ROOM
DRUG ROOM
RECORD ROOM
VAULT
X-RAY OPERATING ROOM
X-RAY R.M.
DRESSING
PATIENT ROOM
DESPENSARY ENTRANCE
DRIVEWAY
EAST 42ND STREET
PLAN OF FIRST FLOOR
HOSPITAL FOR THE RELIEF OF THE RUPTURED AND CRIPPLED
SCALE
YORK AND SAWYER ARCHTS

FIG. 263

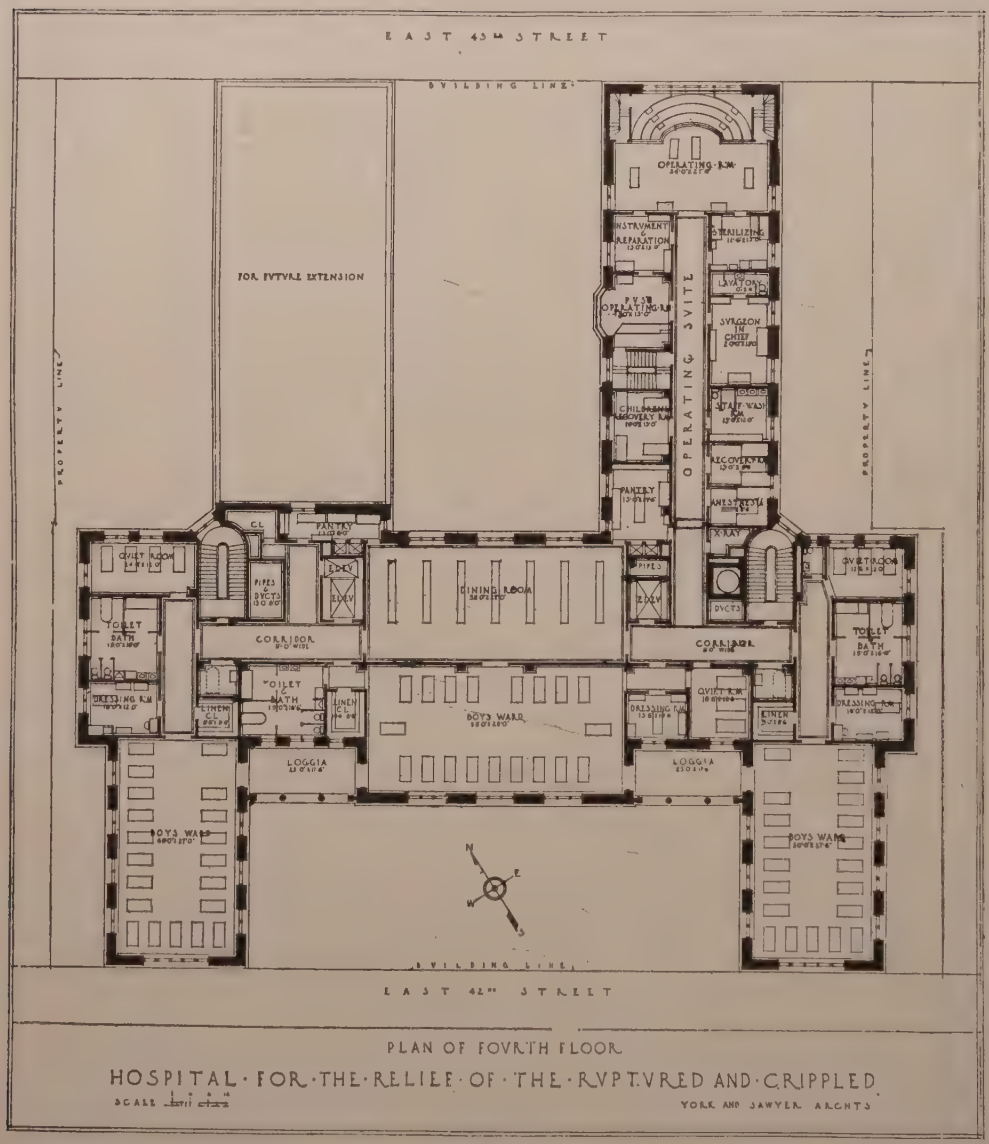
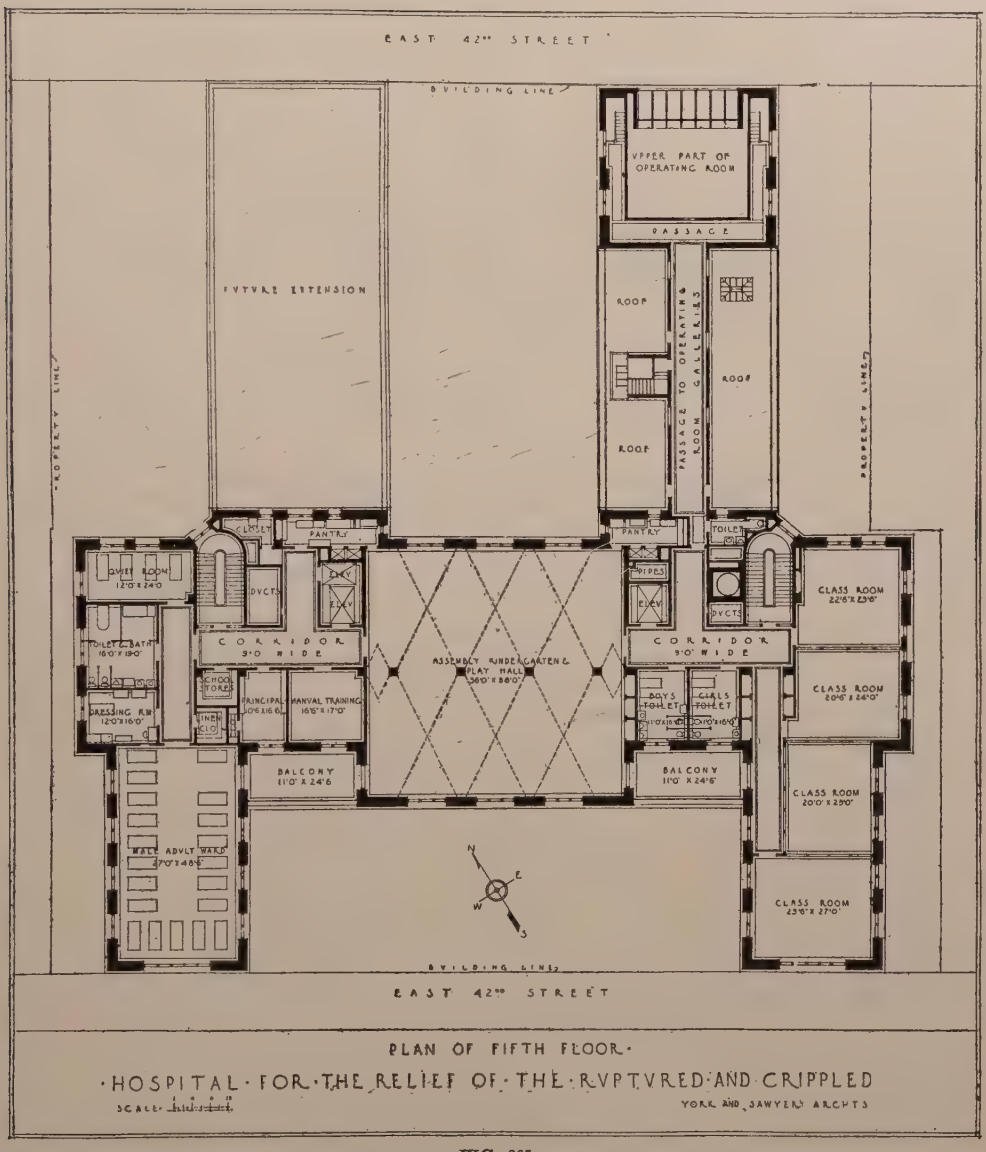

EAST 43RD STREET
BUILDING LINE
PROPERTY LINE
FOR FUTURE EXTENSION
OPERATING SUITE
OPERATING RM.
STERILIZING
LAVATORY
SURGEON IN CHIEF
STAFF WASH RM.
RECOVERY
ANESTHETIC
X-RAY
PANTRY
DINING ROOM
CORRIDOR
QUIET ROOM
TOILET & BATH
DRESSING RM.
LINEN CL.
BOYS WARD
LOGGIA
EAST 42ND STREET
PLAN OF FOURTH FLOOR
HOSPITAL · FOR · THE · RELIEF · OF · THE · RUPTURED AND · CRIPPLED
YORK AND SAWYER ARCHTS

FIG. 264




PLAN OF FIFTH FLOOR.

HOSPITAL FOR THE RELIEF OF THE RUPTURED AND CRIPPLED

SCALE 1/16" = 1'-0"

YORK AND SAWYER, ARCHTS

FIG. 265

On the third floor are the wards for girls and female adults, together with dining-rooms for patients.

The fourth floor plan is similar, except that the operating department is here located.

The fifth floor contains the class and school rooms and the large assembly halls for the children, while on the sixth are the great out-of-door wards and solariums.

The color scheme throughout is most pleasing and is most artistically carried out.

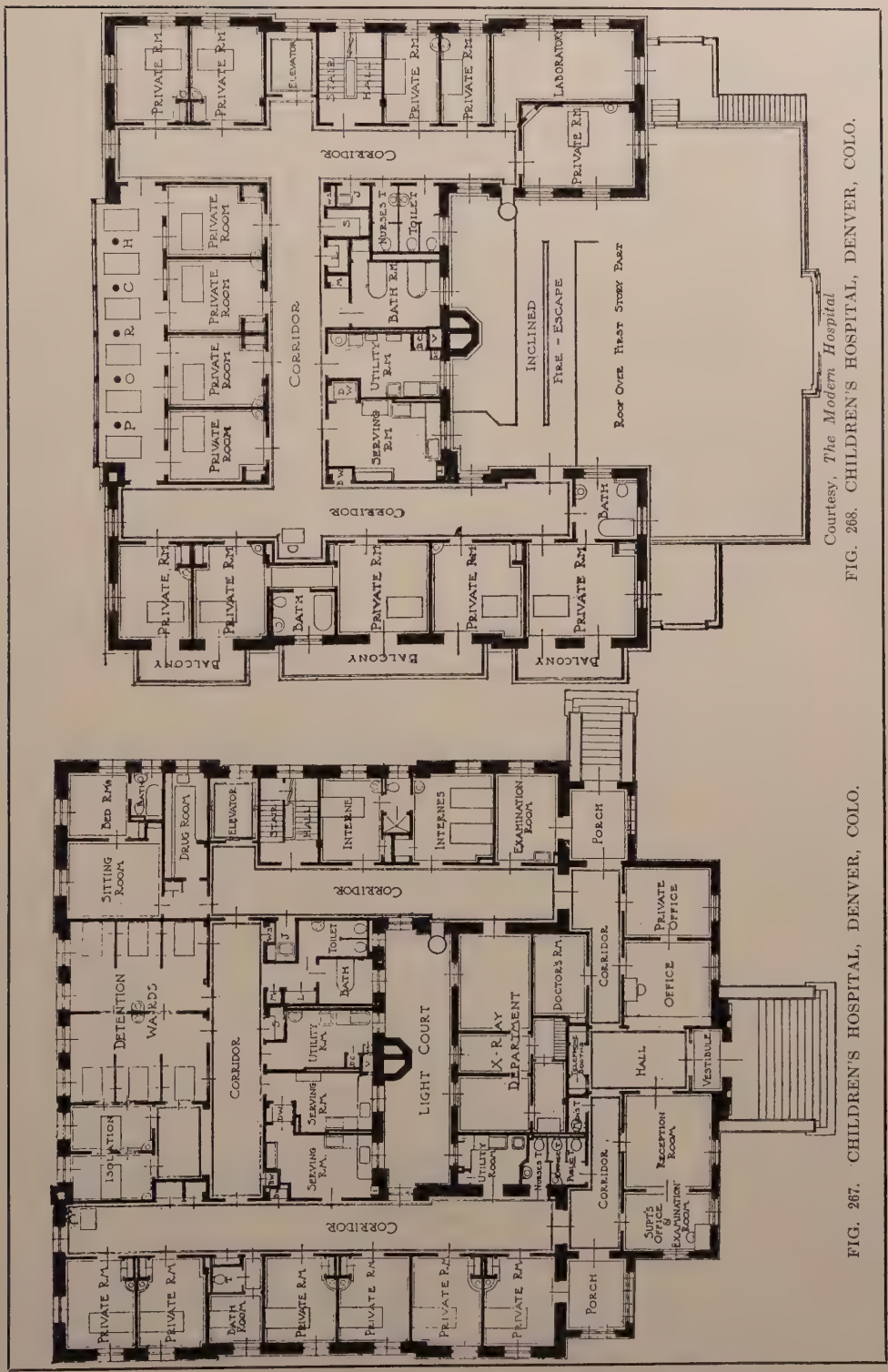
The CHILDREN'S HOSPITAL, Denver, Colorado (Figs. 266-270), which accommodates about seventy-five patients, has an unusual plan, being a U-shaped building above the first floor. It has complete facilities for caring for private and ward patients and for outdoor

Courtesy, *The Modern Hospital*

FIG. 266. CHILDREN'S HOSPITAL, DENVER, COLO.
Maurice B. Biscoe, Architect. Dr. S. S. Goldwater, Consultant

treatment. There is an excellent operating department and a good X-ray. Ample isolation rooms, so necessary in children's work, are placed in a separate corridor on the lower floor. A kindergarten room and bedside teaching for the children who wish to keep up their school work are features of the hospital.

The HEYWOOD HOSPITAL, Gardner, Massachusetts, built a dozen years ago, has recently added a small children's department (Fig. 231). It contains private rooms, wards, surgical dressing room, play




Courtesy, *The Modern Hospital*

FIG. 268. CHILDREN'S HOSPITAL, DENVER, COLO.

FIG. 267. CHILDREN'S HOSPITAL, DENVER, COLO.

Courtesy, *The Modern Hospital.*

FIG. 269

CHILDREN'S HOSPITAL, DENVER, COLO.
Maurice B. Biscoe, Architect. Dr. S. S. Goldwater, Consultant

Courtesy, *The Modern Hospital.*

FIG. 270

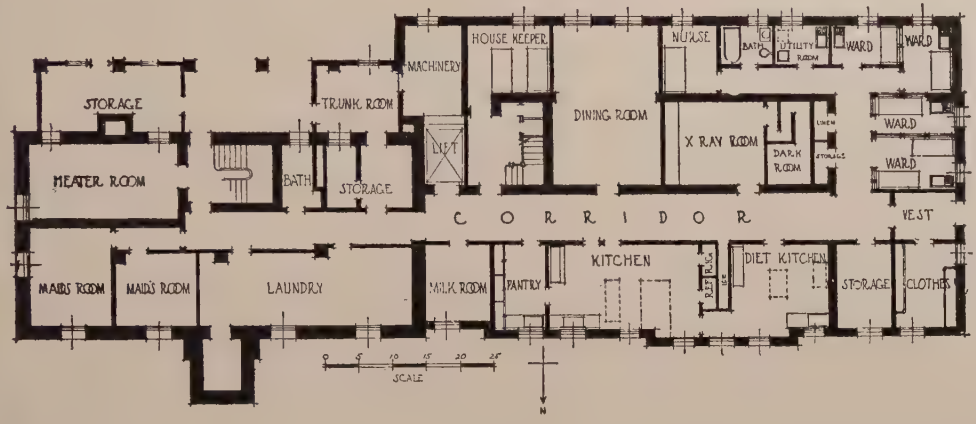



FIG. 271. Ground Floor

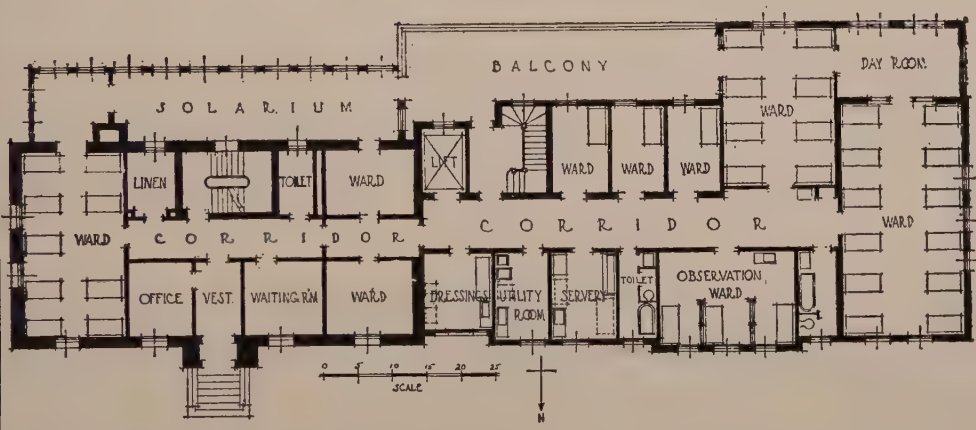



FIG. 272. First Floor

CHILDREN'S HOSPITAL, HALIFAX, N. S.
Stevens & Lee, Architects

room, large airing balcony, and a special wash room with high slab tub, low toilet and low wash basin. In the admitting ward, three cases can be kept under observation.

Connected with the main group, the Children's Department, known as the AMERICAN MEMORIAL HOSPITAL at Reims, France (Fig. 261), offers an interesting solution of the children's unit.

This hospital is divided into two portions—1st, the regular hospital which contains the offices and general administration, general wards and private wards; and 2nd, the isolation department which will be used as the admitting department for the large majority of the cases.

FIG. 273. CHILDREN'S WARD, WILHELMINA HOSPITAL, VIENNA, AUSTRIA

FIG. 274. WARD IN CHILDREN'S HOSPITAL, MUNICH, GERMANY

In the main hospital are the main office, a large reception or waiting-room for visitors, offices for the admitting doctor, play rooms, serving rooms, and two wards of ten beds each.

A serving room (*office*) is provided in each section, which connects to the children's dining-room *(salle à manger)* and the play room *(salle à jeux)*. From the nurses' station *(infirmière)* there is an outlook window into each of the large wards.

Connected with each ward is the solarium *(terrasse)*, from which access is had to the grounds which are laid out with walks and fountains.

In the isolation building there is a separate entrance for suspected cases. This admitting room *(salle d'attente)* is divided into cubicles so that each patient can be isolated instantly until the case is diagnosed.

From the examining room, entered from this admitting room, the patient is given the entrance bath, is provided with hospital clothing, and entered in one of the three-bed wards. These wards are divided into cubicles which isolate each patient from his neighbor. Directly connected with each three-bed ward are the toilet and sink-room. Observation windows from the corridor afford complete surveillance over all patients without entering the ward.

The Children's Hospital, Halifax, Nova Scotia, shows an addition to an existing building (Figs. 271 and 272) which doubles its capacity. In the basement, there is an isolation department for five or six patients, the main kitchen, dining room and a special milk room.

The first floor is the main hospital; it provides wards, single rooms, a special three-part observation ward, a surgical dressing room, a day room, and a large balcony. On the second floor are the nurses' quarters.

The Wilhelmina Hospital, Vienna, Austria, has some good features. The illustration (Fig. 273) shows the division of a ward into cubicles. The pedestal at the left is the slab for bathing, the spray coming from above.

# CHAPTER IX

## THE DEPARTMENT FOR COMMUNICABLE DISEASES

THE control of contagion is recognized as one of the most serious problems with which the hospital has to deal. In the previous chapter it has been shown how possible or suspected cases of communicable disease are being handled in a general hospital, in children's departments or buildings. It is now conceded that no hospital is complete unless provision is made for the isolation of the occasional infection which develops in even the best-regulated wards; such a section need not be large, but it should be provided with adequate utilities, so that patients may be cared for in it without contact with other parts of the hospital except for food supply. The most important equipment details are sterilizers and conveniently placed, non-hand-touching scrub-up basins.

In all the large general hospitals of Europe, departments for the care of communicable diseases are provided and generally consist of

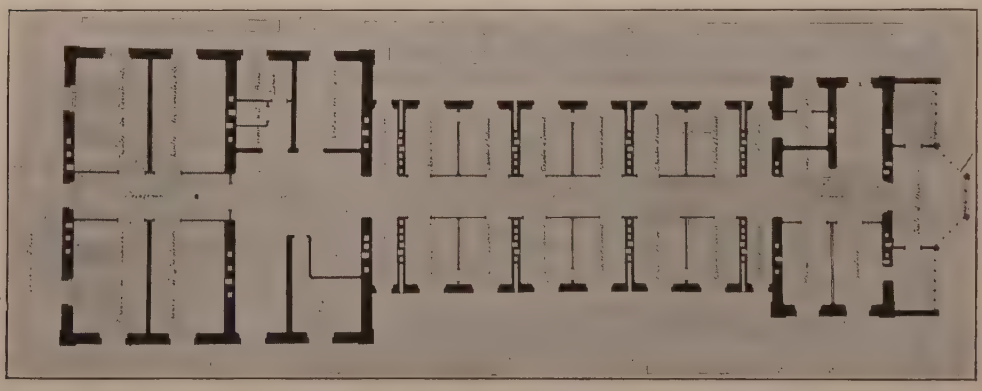


FIG. 275. FLOOR PLAN, PASTEUR HOSPITAL, PARIS, FRANCE

separate, detached buildings, which are complete units divided into small wards with complete service rooms and equipment. Among those which are particularly interesting technically are those at Eppendorf, Virchow, West End Berlin, and Lindenberg-Cologne.

Perhaps no hospital in Europe has carried the newer principles of infection to a higher development than the Pasteur Hospital in Paris. In 1907, visiting this hospital for the first time, the author saw, to his great surprise, cases of scarlet fever, measles, diphtheria, sleeping sickness and other communicable diseases side by side in one building, with-

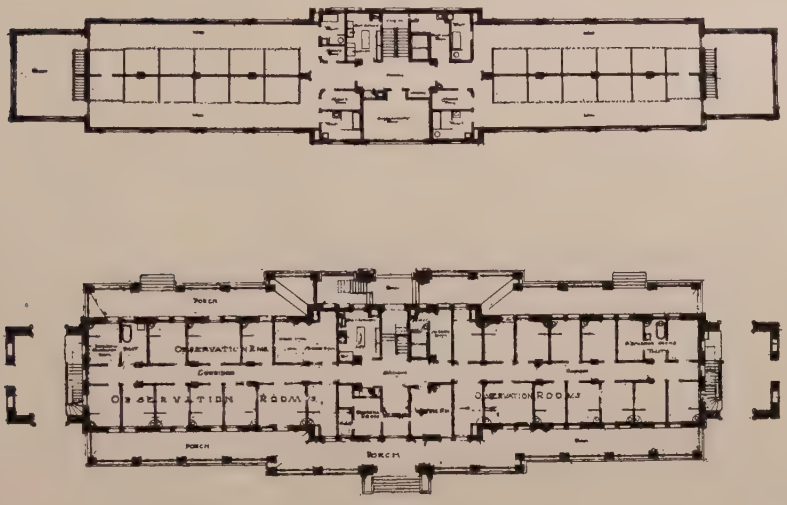


FIG. 276. MEASLES PAVILION, WILLARD PARKER HOSPITAL, NEW YORK, N. Y.

in plain view of the nurse and the visitor and separated from each other only by plate glass partitions. Our training had been that to care safely for contagious cases one must have at least a separate department, if not separate buildings. Still more surprising was it to find that while these various diseases were in the same building and being cared for by the same nurse, the record of the five years preceding my visit,

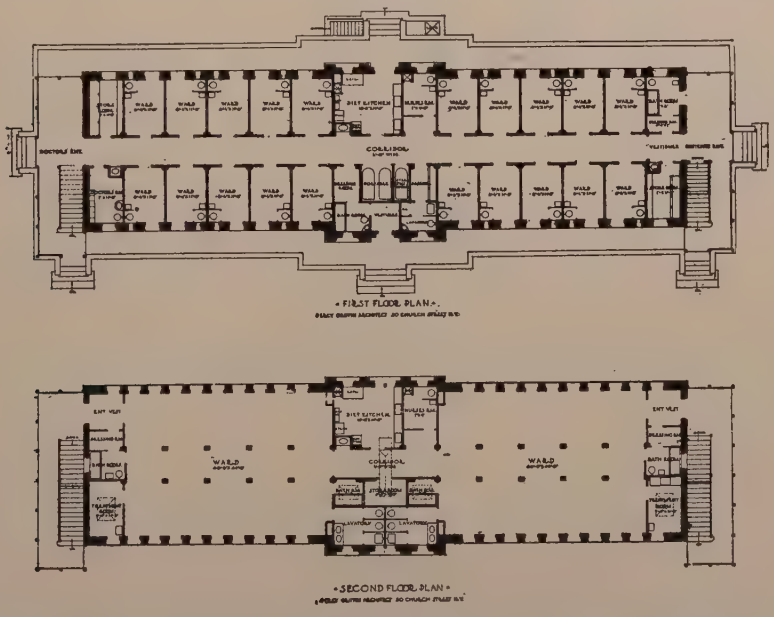


FIG. 277. ISOLATION PAVILION, KINGSTON AVENUE HOSPITAL, BROOKLYN, N. Y.
Percy Griffin, Architect

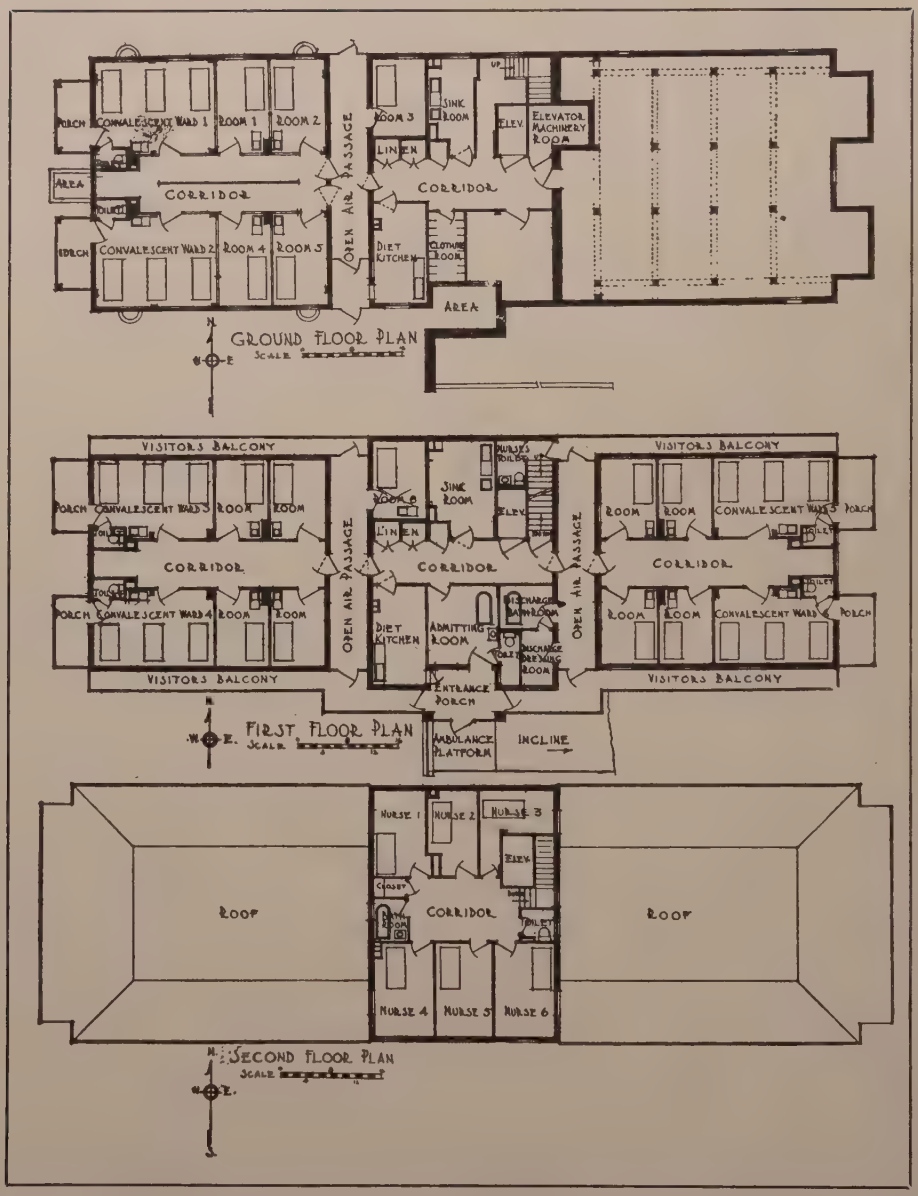



FIG. 278. WHITE ISOLATION BUILDING, ST. LUKE'S HOSPITAL, JACKSONVILLE, FLA.
Edward F. Stevens, Architect; Mellen C. Greeley, Associate

FIG. 279. WHITE ISOLATION BUILDING, ST. LUKE'S HOSPITAL, JACKSONVILLE, FLA.

with a service of nearly five thousand cases, showed the cross or internal infection to be only two to the thousand.

Friends are allowed to visit the patients, communicating with them from the open balcony provided for the purpose. This balcony extends in front of all rooms.

In an interview with Dr. Louis Martin, the director of the Pasteur, and from his book,* "Hygiène Hospitalière," the writer gathered the following facts:

(a) The service is divided into two sections—that for the very ill patients and that for convalescents. Between these two sections are the service rooms (Fig. 275) and fresh air passages, so that the patient must pass through an area of fresh air in being transferred from one department to another.

(b) In caring for all cases, the nurse wears a special gown for each room or cubicle, never removing the gown from the room except for cleansing.

(c) After handling the patient or anything which the patient has touched, the nurse washes her hands thoroughly.

(d) All utensils are disinfected by boiling or otherwise.

*"Hygiène Hospitalière," J. B. Baillière et Fils; Paris, 1907.

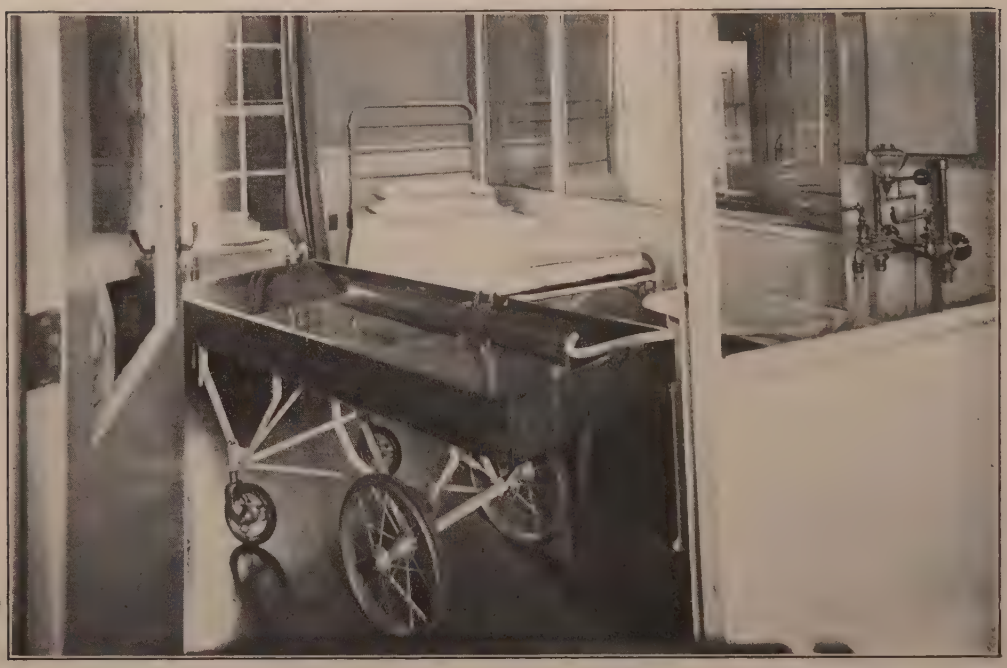


FIG. 280. ISOLATION BUILDING, ST. LUKE'S HOSPITAL, JACKSONVILLE, FLA.
VIEW IN SINGLE ROOM

FIG. 281. THREE-BED WARD. ISOLATION BUILDING, ST. LUKE'S HOSPITAL, JACKSONVILLE, FLA.

FIG. 282. CORRIDOR IN ISOLATION DEPARTMENT, OHIO VALLEY GENERAL HOSPITAL, WHEELING, W. VA.

FIG. 283. ISOLATION BUILDING, HOSPITAL FOR SICK CHILDREN, TORONTO, CANADA

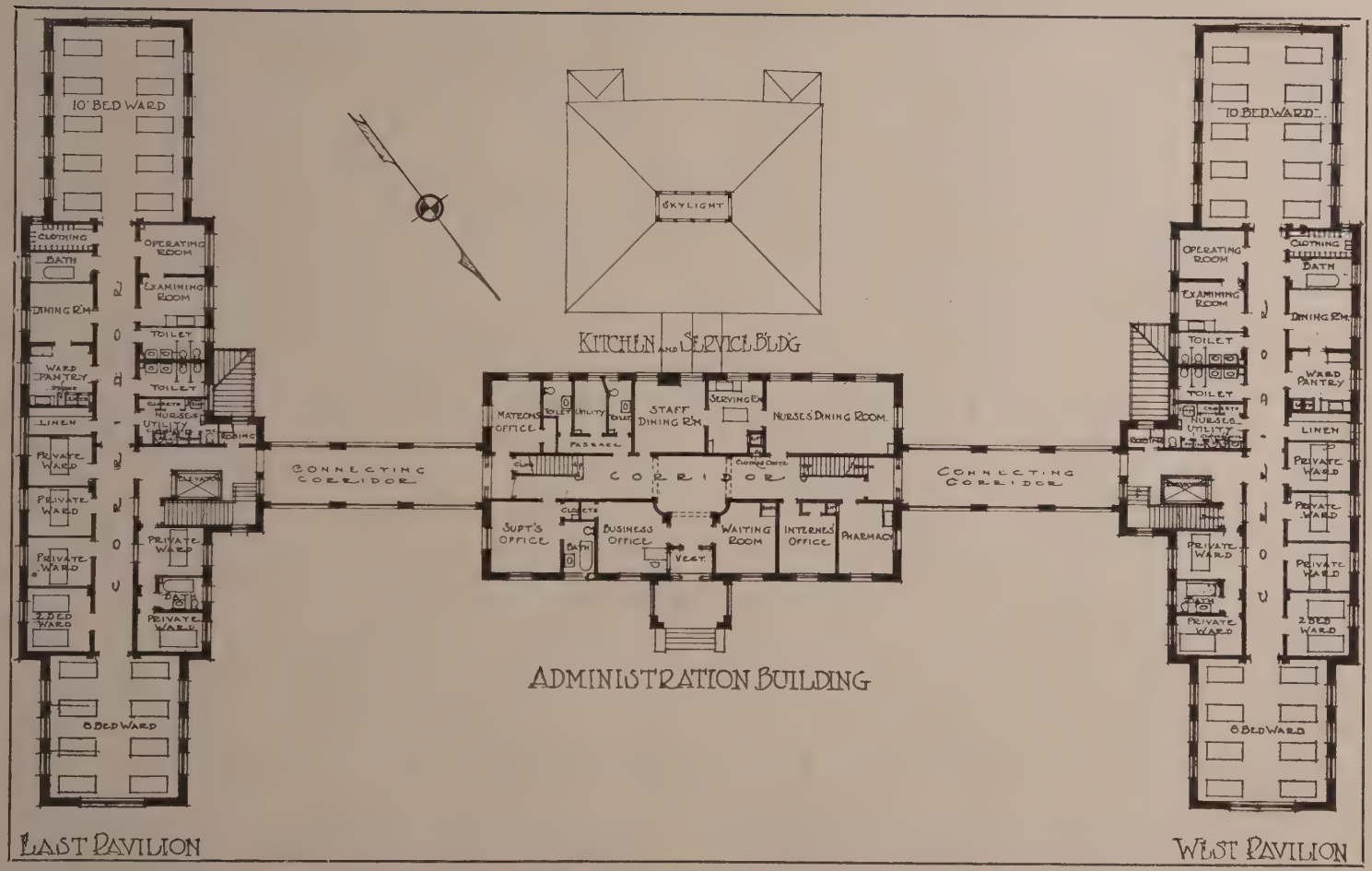



FIG. 284. JOHN C. HAYNES MEMORIAL, MASSACHUSETTS HOMEOPATHIC HOSPITAL, BRIGHTON, MASS.

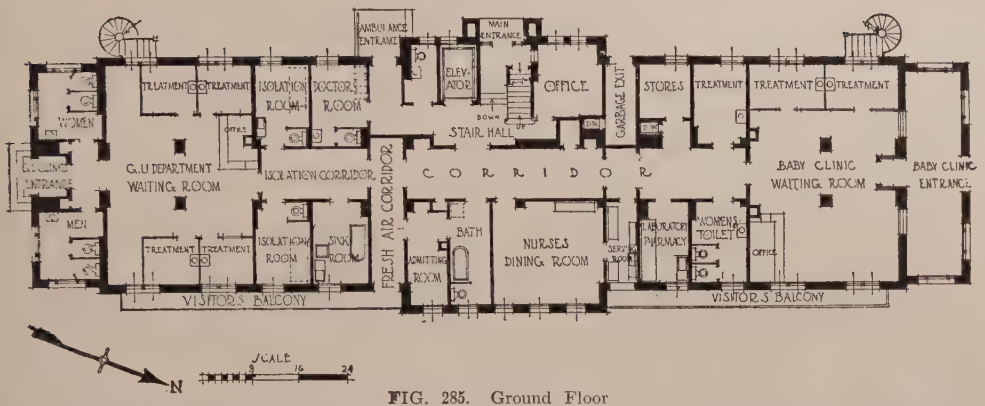



FIG. 285. Ground Floor

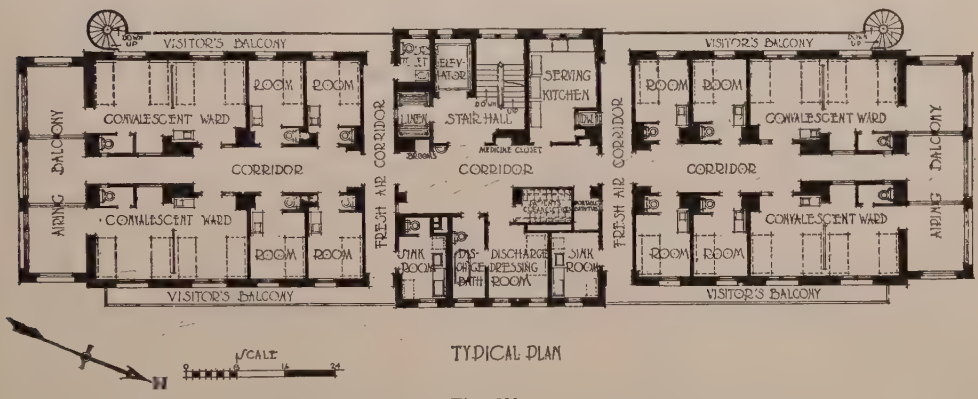



Fig. 286.
JACKSON COUNTY ISOLATION HOSPITAL, JACKSON, MICH.
Edward F. Stevens, Architect

This is Dr. Martin's description of the rooms.

> "The partitions of the room are glazed to facilitate surveillance and to render isolation less irksome to the patient, for through the glass partitions the patient remains in contact with the world outside, which is a great comfort to him.
>
> "The patient in his room ought to be sheltered from all cross infection, whether it be from the hospital or from outside. Everything which enters the room shall be sterile, or at least freed from all noxious germs. All that leaves his room must also be sterilized."

In other words, the laws of antisepsis and aseptic surgical technique must be observed.

On these principles many of our newer American hospitals for contagious diseases are now being built. The theory is that none, or comparatively few, of the communicable diseases are transmitted other than by contact, and the best authorities agree that true air-borne infection is very rare.

Courtesy of Hospital Management
FIG. 287. PROVIDENCE CITY HOSPITAL, PROVIDENCE, R. I.

We should then plan our hospital for communicable diseases:

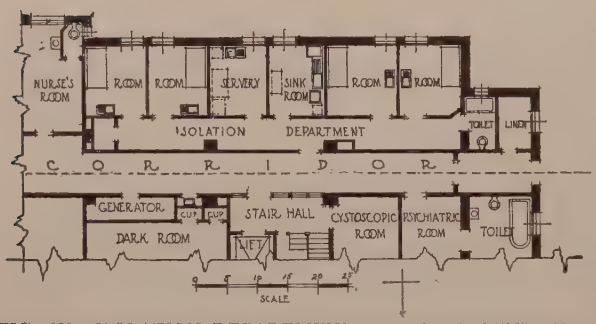



FIG. 288. ISOLATION DEPARTMENT, VICTORIA GENERAL HOSPITAL, HALIFAX, N. S.
Stevens & Lee, Architects

1st—So that the nurse or doctor, after contact with the patient, can have ample and immediate opportunity to scrub the hands.

2nd—So that sterilizers can be provided for sterilizing every article that goes to the patient or is taken from the patient.

3d—So that provision can be made for the removal and destruction of waste, either by local incinerators or properly protected receptacles to convey to the general destroyer.

Then there must be the careful observance of strictly surgical technique—i. e., as in the surgical case the area around the open wound is clean, unless infected by contact with some unsterile instrument, or unclean hands, so the area around the infected patient is clean unless polluted by touch or contact from the patient or some one or something which the patient has touched.

Perhaps no man in this country has given more thought and study to this subject than has Dr. Chas. V. Chapin,* the Providence, Rhode Island, Health Commissioner, ably assisted by Dr. D. L. Richardson, superintendent of the Providence City Hospital.† Here theory

* "Sources and Modes of Infection."

† Dr. Richardson's excellent series of articles on "The Care of Infectious Diseases in Hospitals" was published in 1919 in *The Modern Hospital.*

FIG. 289. ISOLATION BUILDING, KINGSTON GENERAL HOSPITAL, KINGSTON, ONTARIO

is supplemented by actual practice, with wonderfully satisfactory results.

In the receiving building of this hospital one will see in rooms adjoining one another, cases of scarlet fever, diphtheria, erysipelas, and measles, with the same physicians, and the same nurses administering to all, the latter eating in the same dining-room, living in the same nurses' home with nurses of other departments of the hospital.

As the service becomes larger or the diagnosis of the cases surer, then the grouping of the various diseases in different buildings becomes an economy, but the technique is never relaxed.

The buildings are ordinary ward units adapted to the care of communicable diseases by the addition of lavatories in each room and by other special equipment. The plan shows the simplicity of the structure.

In special cases, visitors are admitted directly to patients' rooms, but are seated at a distance from the patient, instructed not to touch him, and are closely watched by a nurse during their stay.

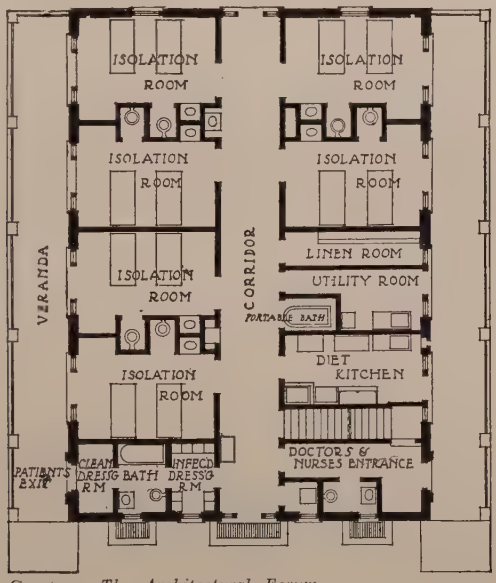
One of the best planned isolation pavilions in this country is that recently built by the Department of Health of the City of New York at the Willard Parker Hospital, and used for a measles building (Fig. 276). Here, on the ground floor, one finds the best form of cubicle system. In addition to the special sink, lights, etc., each cubicle has a small well-ventilated toilet room entered from the room, containing a watercloset, making it unnecessary for the patient to leave the isolating room until he is convalescent or discharged.

FIG. 290. PLANS, ISOLATION BUILDING, KINGSTON GENERAL HOSPITAL, KINGSTON, ONTARIO
Stevens & Lee, Architects

The admitting pavilion (Fig. 277) of the KINGSTON AVENUE HOSPITAL of the Department of Health, City of New York, is well planned, providing for separate service and entrance from the outside, if necessary, to every room on the ground floor. This, too, has separate toilets for each cubicle or room.

The contagious department of the ST. LUKE'S HOSPITAL, Jacksonville, Florida, consists of separate pavilions for white and colored. (See general plan, Fig. 19.)

The plan is an adaptation of that of the Pasteur Hospital of Paris (Fig. 275) and does away with all the cumbersome and elaborate arrangements of the old school (Fig. 278). All classes of contagious




Courtesy, *The Architectural Forum*

FIG. 291. ISOLATION BUILDING, HURLEY HOSPITAL, FLINT, MICH.

Davis, McGrath & Kiessling, Architects

diseases, with the exception of smallpox, which is still cared for at a distance from other people, largely on account of popular prejudice, are treated in one building. There are single rooms for fresh cases and wards for convalescents. The rooms are cubicles, with glass partitions for ease of observation, each cubicle being a separate entity, complete in itself. Correct technique, the so-called "medical asepsis," prevents the spread of infection, but facilities must be provided for carrying it out.

The central portion of the building is the administrative department, being occupied by the admitting and discharge rooms and the

Courtesy, *The Architectural Forum*

FIG. 292. ISOLATION BUILDING, HURLEY HOSPITAL, FLINT, MICH.
Davis, McGrath & Kiessling, Architects

various utilities, with the office of the nurse in charge. An open air cut-off separates this from the part occupied by patients.

Each room or ward is furnished with a scrub-up sink, with elbow faucets, so that after any service for the patient the physician and the nurse scrub and disinfect their hands before leaving the room. They also wear gowns while caring for the patient, leaving them on hooks inside the door before they depart.

The equipment consists of utensil sterilizers, which can be opened by the foot; elbow handles for the faucets over slop sinks; dish sterilizers large enough to take a tray and its dishes; garbage incinerators which may be opened by elbow; liquid soap dispensers with pedal action; lever door handles which can be opened by elbow or upper arm; and everywhere scrub-up sinks with elbow handles. By means of these carefully worked out details the nurse is enabled to care for a patient, dispose of all waste material, and accomplish the disinfection of all utensils and appliances used in the process, without touching anything else. At the close of each procedure she sterilizes her hands and removes her infected gown, becoming clean again, to start upon the same round with another patient.

When a patient is admitted, he is bathed on the shallow tub-slab with a spray, so he gets what is practically a shower bath or shampoo in running water. He is then placed in a single room. When convalescent, he is transferred to the small ward, where there may be other patients recovering from the same disease. This ward is treated as a unit, but the aseptic technique is still carried out.

A portable tub (Fig. 280), similar in principle to the one in the admitting room, but made of wood covered with copper for lightness, set on a wheeled stretcher frame of the same height as the beds, is also provided. This may be taken to any room, the patient transferred to it, and bathed with a spray attached to the faucet at the scrub-up sink. A floor drain in each room receives the waste water from the tub. The tub is disinfected after each using.

When the patient has recovered and is to be discharged, he is taken through the open air corridor to the discharge room, given a cleansing and disinfecting bath, and passed into the dressing room, where he receives his own uninfected clothing. From this room he departs without coming into contact with other persons or parts of the buildings. (See also Figs. 280 and 281.)

Hospital finish of the simplest and strictest sort has been carried out in these pavilions and everything made so as to be easily cleaned. The furniture is extremely simple, the rooms having no more than a bed, a comfortable chair, and a table, besides the all-important sink or lavatory. These sinks were made special, being provided with an integral drain-board upon which to place hand brushes and other appliances.

The convalescent wards have toilets directly off them, and each has its own screened-in porch.

All floors are of cement, painted. Washable rugs are provided for the rooms of the convalescents.

Visitors are not allowed in the building, but there is a narrow balcony running in front of every room, like the Pasteur, so that parents and friends may come to the patient's window, see and talk with him, and know how he is getting on. This one provision probably does as much as any one thing to establish confidence in a contagious hospital.

Though there is considered to be no adequate reason why the nurses caring for contagious cases may not mingle with other nurses, it has been deemed wisest, at the present time, to house them in the isolation pavilion. The second floor, therefore, provides single rooms for six nurses, with baths, etc., these rooms being fully as commodious

as those at the nurses' residence. This floor has a separate entrance, through one of the open air corridors.

The pavilion provided for white persons has rooms for patients on two floors, one accommodating twenty and one eleven patients.

The pavilion provided for colored persons accommodates eleven patients. It is an exact counterpart of the administration portion and one wing of the white pavilion.

If the theory of isolation and the technique of care are correct, then infectious diseases can be safely cared for in the general hospital. This is now being carried out in the Ohio Valley General Hospital. While this department (Fig. 110) is in the main building, it is nevertheless isolated by a fresh air cut-off from the other rooms on this floor. Separate serving kitchen and sink room are provided as well as every facility for cleansing the person of the patient, for the work of the nurse, and all utilities. The nurse, after thoroughly cleansing her hands and changing the department gown, mingles freely with the other nurses of the hospital.

The isolation unit (Figs. 240, 283), of the Hospital for Sick Children, Toronto, Canada, has been developed on the Pasteur principle, or much like the Isolation Department of St. Luke's Hospital at Jacksonville, with air cut-offs between the acute, the service, and the convalescent departments. Each cubicle is provided with the sink described in the Jacksonville Isolation. Food is delivered in the open corridor through a window to the serving kitchen. Under this window is the dish sterilizer, the cover of which is controlled from either side of the wall.

Small operating rooms are provided in each story. A separate staircase is also provided for the discharged patients, leading from the discharge room or cross corridor.

The contagious department of the Massachusetts Homeopathic Hospital at Brighton (Fig. 284) provides for all classes of communicable diseases. The plan consists of a three building unit, connected by open corridors. The general administration building is in the center, flanked by the ward units.

The Isolation Hospital of Kingston, Ontario, Canada (Figs. 289 and 290), is designed to accommodate about fifty-five patients, ten nurses and four other employees. On the first floor patients may be admitted through the office at the front or by ambulance at the back. The admitting rooms have a bath and a sterilizer for patients' clothing. The discharge room is large enough to accommodate a bed. The ward floors have small wards and single rooms, designed for

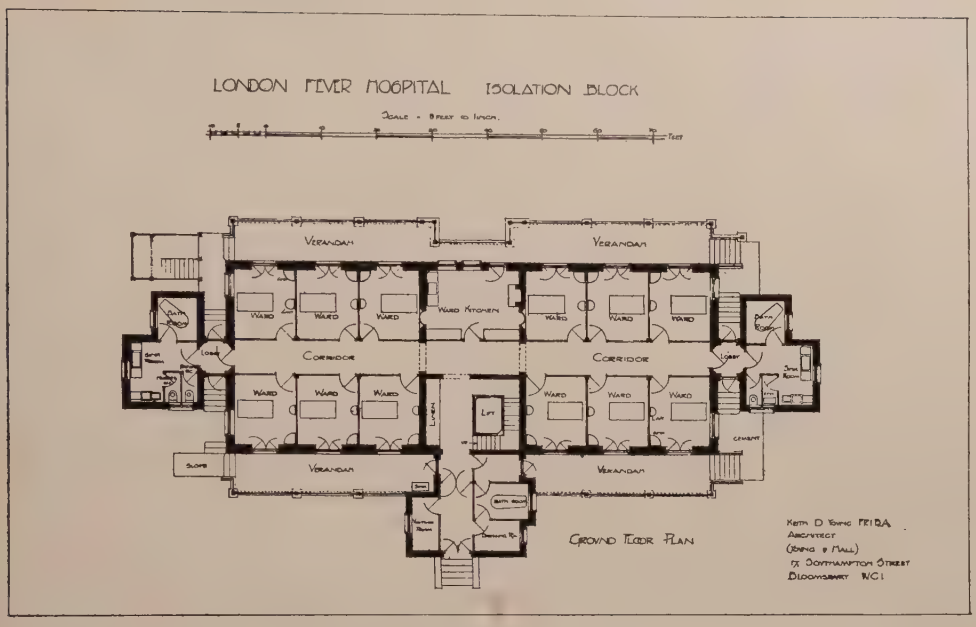



FIG. 292A. LONDON FEVER ISOLATION BLOCK, LONDON, ENG.
Keith D. Young, F.R.I.B.A., Architect

carrying out the "Pasteur" technique, each ward having its own lavatory and toilet. There are solaria opening from the convalescent wards. The serving kitchens have large sterilizers for dishes. Provision is made for a portable tub, if desired.

On the second floor is a small operating room, with a special room for incubations. The nurses' stations are centrally located. The top floor accommodates ten nurses in single rooms. Four maids' rooms are in the basement.

For general location see Fig. 19B.

The admitting department of the BUFFALO CHILDREN'S HOSPITAL, Buffalo, New York, is an efficient isolation unit, having all necessary facilities for the carrying out of medical asepsis. (See Figs. 257-259, Chap. VIII.)

The JACKSON COUNTY ISOLATION HOSPITAL, Jackson, Michigan, is planned for four floors like the one shown (Fig. 286). The unit can easily be adapted to a building of any height. The center is the service portion and is kept uninfected. It has an open air corridor which divides it from the ends, which are the parts occupied by patients. In each patients' section there are four single rooms and two wards with two-bed cubicles. Each ward has a special scrub-up sink with elbow-control faucets; each has its own toilet, those in the private

wards being shut off by a washable curtain instead of a partition. The balcony is divided into three sections, one for each ward and one opening from the corridor. Visitors' balconies run the full length, and are accessible only from outside the building.

The sink rooms, which are included in the service portion of the unit, open on the fresh-air cut-off. The commodious discharge rooms are noticeable, being designed so that two or more patients may be discharged almost at once, or that a patient may have a comfortable place to rest while awaiting the conveyance to take him home. There is a good serving kitchen, a linen room, a room for patients' clean clothing, and special toilets for doctors and nurses.

In the central portion of the ground floor is the admitting department. In the right wing is the children's out-patient department; in the left wing is the genito-urinary clinic, with rooms for the isolation and care of venereal cases (Fig. 285).

The isolation department of the Victoria General Hospital, Halifax, Nova Scotia (Fig 288), provides for patients in separate small rooms or cubicles, each being complete. It has a special serving kitchen and utility rooms. The double-action plumbing fixtures make proper technique easy.

The Children's Hospital at Halifax, Nova Scotia (Fig. 271), has in its isolation department a special room for a nurse, if it is desired to isolate her along with the patients. The Ottawa Civic Hospital, Ottawa (Fig. 86), the Notre Dame Hospital, Montreal (Fig. 93), the Children's Hospital of the District of Columbia (Figs. 249-254), and the Good Samaritan Hospital, Sandusky, Ohio (Fig. 425), present examples of small isolation departments in general hospitals which can be administered without disturbing the rest of the institution.

The plan of the isolation building of the Hurley Hospital, Flint, Michigan (Figs. 291, 292), shows a unit designed for twelve patients, in two-bed wards. Each ward is an independent unit, with toilet and scrub-up facilities, and an exit to the terrace outside. A portable tub is provided for bathing. The second floor, which houses three nurses and a maid, has a separate entrance; it provides a sitting room, dining room and kitchen.

The plan of the Isolation Block of the London Fever Hospital (Fig. 292A) is founded to some extent on that of the Pasteur Hospital at Paris.

The wards are all single rooms separated from each other and the corridor by plate glass partitions. Six wards for male patients are

at one end and six for female patients at the other, and between the two sets of wards is the ward kitchen. Each ward has a door opening onto an open veranda. At the entrance is a set of rooms (undressing, bath and dressing) for patients on leaving the hospital.

The wards are provided with hot water radiators with fresh air inlets and each ward has an exhaust duct formed in the space between the first floor and the ceiling of the corridor. These twelve ducts are all connected to an exhaust fan in the roof. Each ward is provided with a lavatory basin with hot and cold water.

The upper floor contains eight pay wards for one bed each.

In hospitals which desire to isolate *venereal* cases, a department arranged as for other communicable cases may be modeled after some of the plans already given.

# CHAPTER X

## THE PSYCHOPATHIC DEPARTMENT

SINCE the beginning of this century, no greater development has been made in any branch of hospital housing and treatment than in the psychopathic and neurological departments.

Only a few years ago the person who was adjudged insane was committed to an asylum; and if resistance were offered he was placed in irons and half starved. The mild cases were herded with the violent—"herded" is the only name for it—and they were treated more as beasts of the field than as human beings whose course of thought was diverted through some slight lesion. The scientific study of the disturbed patient has shown that in most cases the modern or humane treatment is productive of the greatest success; and psychopathic hospitals, either as independent institutions or as departments of a general hospital, are being considered everywhere. The psychopathic hospital then becomes a clearing-house for the study and segregation of cases.

Whether or not a general hospital should have a psychopathic department must be settled by local conditions, the interest of the men on the staff, etc. Since insanity and nervous conditions are said to be on the increase, and more attention is being paid to the care and cure of "borderline" mental cases, it would seem necessary for large hospitals to make some definite provision for these cases. It is quite certain that mental cases cannot be properly cared for among other patients, nor by nurses and attendants unfamiliar with their special requirements. A separate building or department appears to be the only solution.

The present tendency is to provide generously for these patients, especially in city hospitals.

In any event, some provision should be made in all general hospitals for the proper isolation and protection of *delirious* patients. One or two rooms can be arranged for, situated so as not to disturb other patients, with windows properly guarded. Such departments are shown on the ground floors of the Ross Pavilion of the Royal Victoria Hospital, Montreal (Fig. 123), the Ohio Valley General Hospital, Wheeling, West Virginia (Fig. 107), and the Ottawa Civic Hospital, Ottawa (Fig. 85).

In this department more than in any other in the hospital it is essential to consider the environment of the patient; the interior must

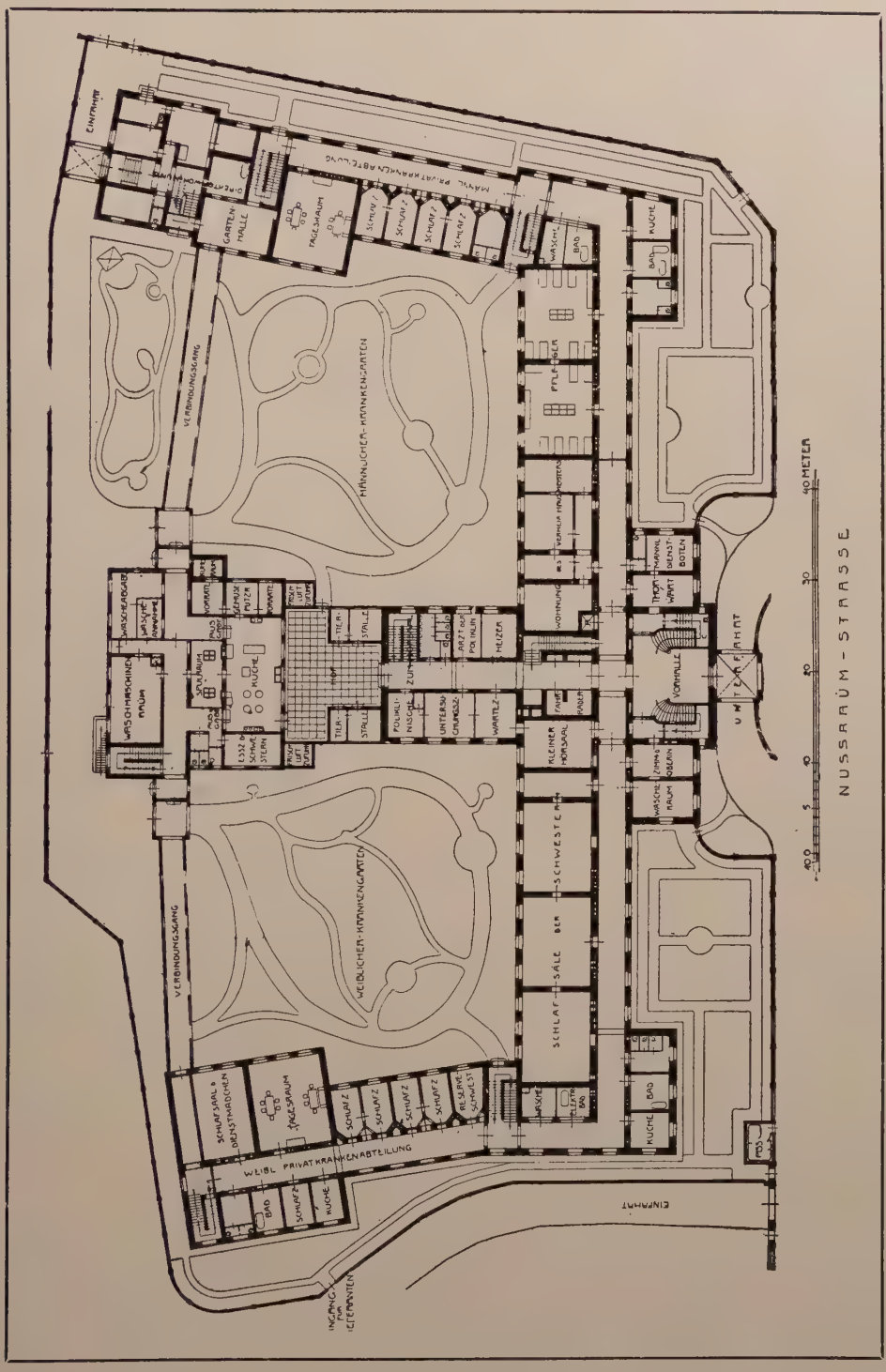



FIG. 293. GROUND FLOOR, PSYCHIATRIC CLINIC, MUNICH, GERMANY

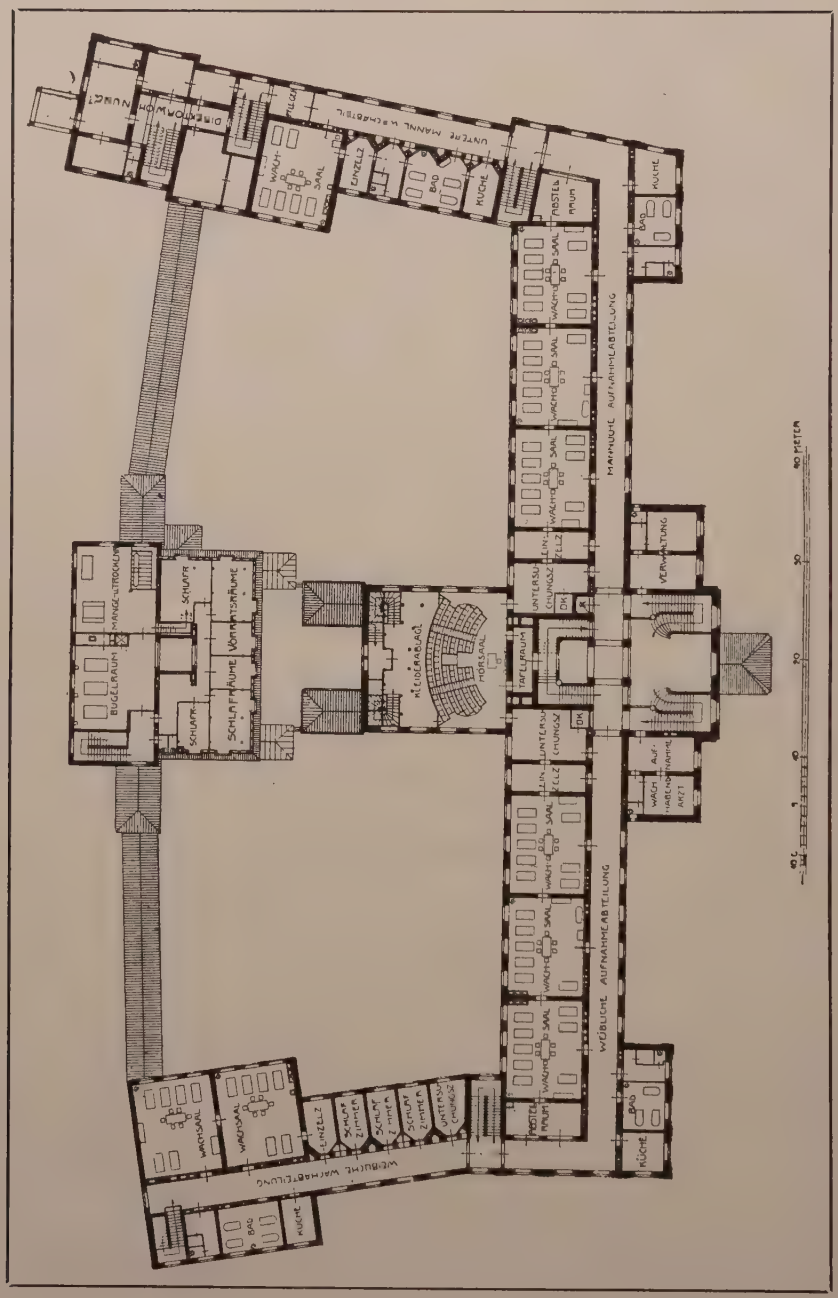
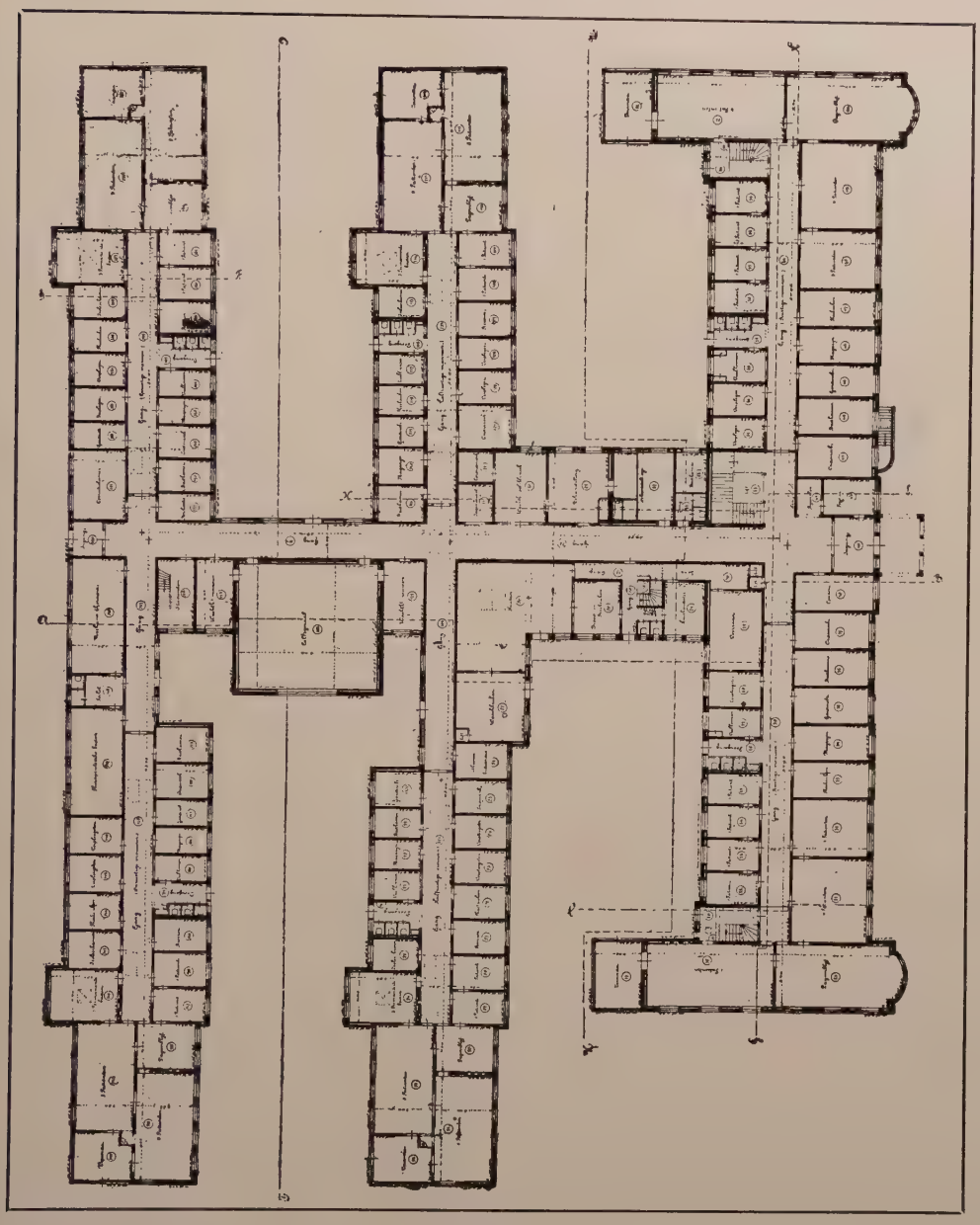



FIG. 294. FIRST FLOOR, PSYCHIATRIC CLINIC, MUNICH, GERMANY



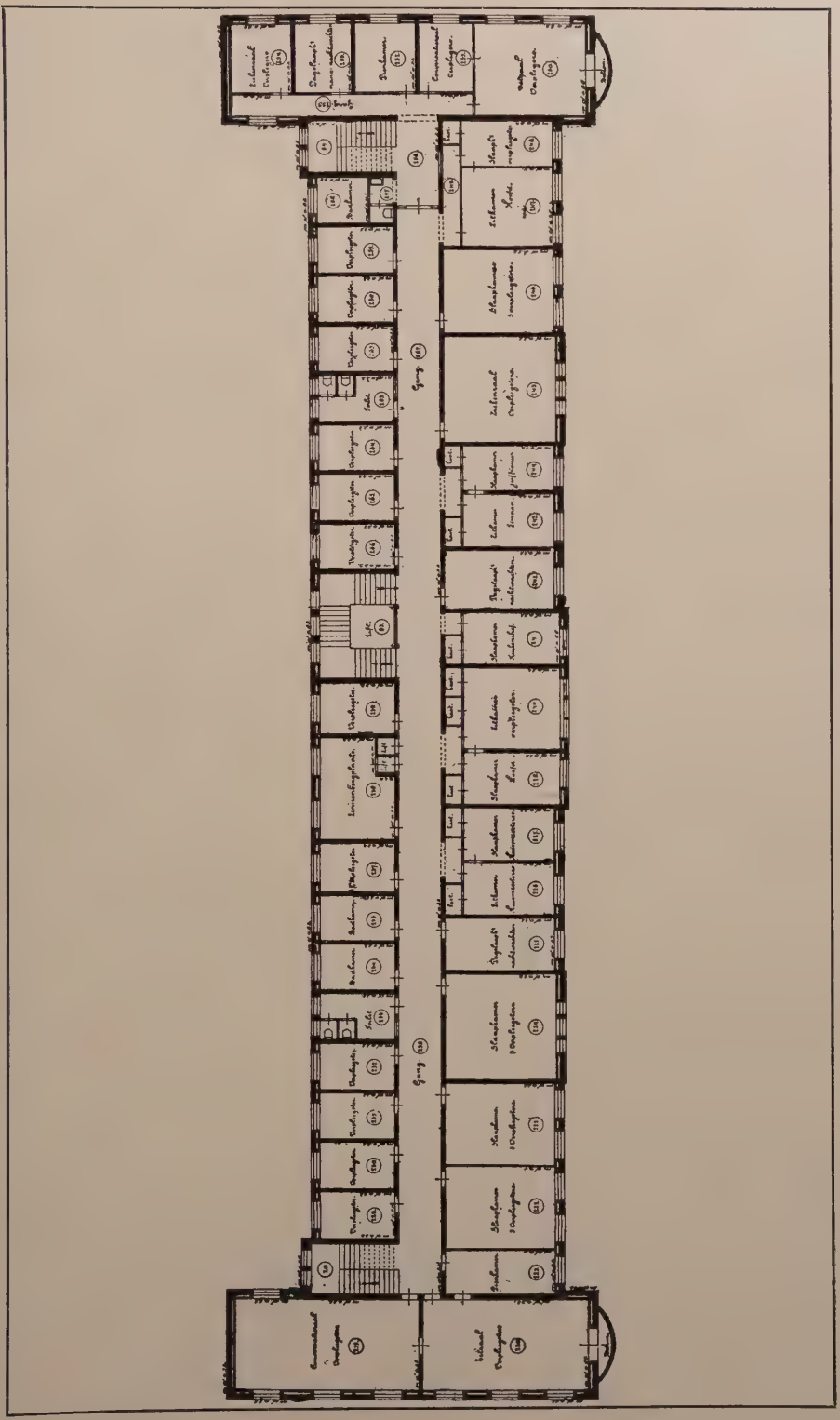
Ground Floor

FIG. 295. PSYCHIATRIC-NEUROLOGICAL CLINIC, UTRECHT, HOLLAND

be restful; there must be nothing in color or design to excite the patient; the surroundings must be home-like, with as little of the institutional appearance as possible. Great care should be used, however, to avoid giving any opportunity for the patient to inflict per-

Second Floor

FIG. 296. PSYCHIATRIC-NEUROLOGICAL CLINIC, UTRECHT, HOLLAND



Third Floor

FIG. 297. PSYCHIATRIC-NEUROLOGICAL CLINIC, UTRECHT, HOLLAND

sonal injury, by providing non-projecting hardware; turned-down door handles; flush transom bars; lighting fixtures out of reach, with no projections; small lights of plate glass in windows, which never open enough to admit the body of a person; special plumbing fixtures, firmly secured; and cabinets for telephones and service built into and not projecting from the wall.

In the Psychiatric Clinic at Munich, Germany (Figs. 293, 294), one hundred and fifty patients are cared for, divided into first, second, and third classes, according to the service and accommodation. Every class is provided with special visiting-day rooms wherein patients may receive their friends. The wards are neat and well kept, and toilets are provided in every ward unit.

FIG. 298. PSYCHIATRIC-NEUROLOGICAL CLINIC, UTRECHT, HOLLAND. CORNER OF WARD

FIG. 299. PSYCHIATRIC-NEUROLOGICAL CLINIC, UTRECHT, HOLLAND. DAY ROOM

Those in the first class have private rooms. Every attempt is made to make the apartments homelike, and no visible form of restraint is noticed.

The second class patients have less luxurious accommodations but have comfortable living rooms and sleeping quarters.

The third class patients occupy wards.

FIG. 300. MASSACHUSETTS PSYCHOPATHIC HOSPITAL, BOSTON, MASS. VIEW FROM THE FENS
Kendall, Taylor & Co., Architects

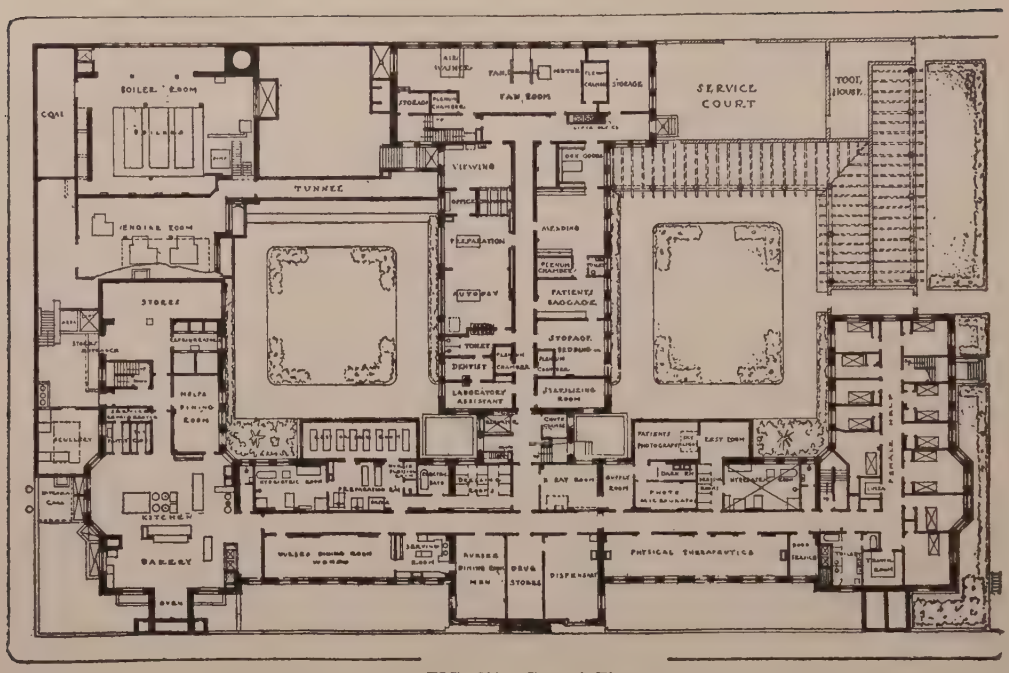
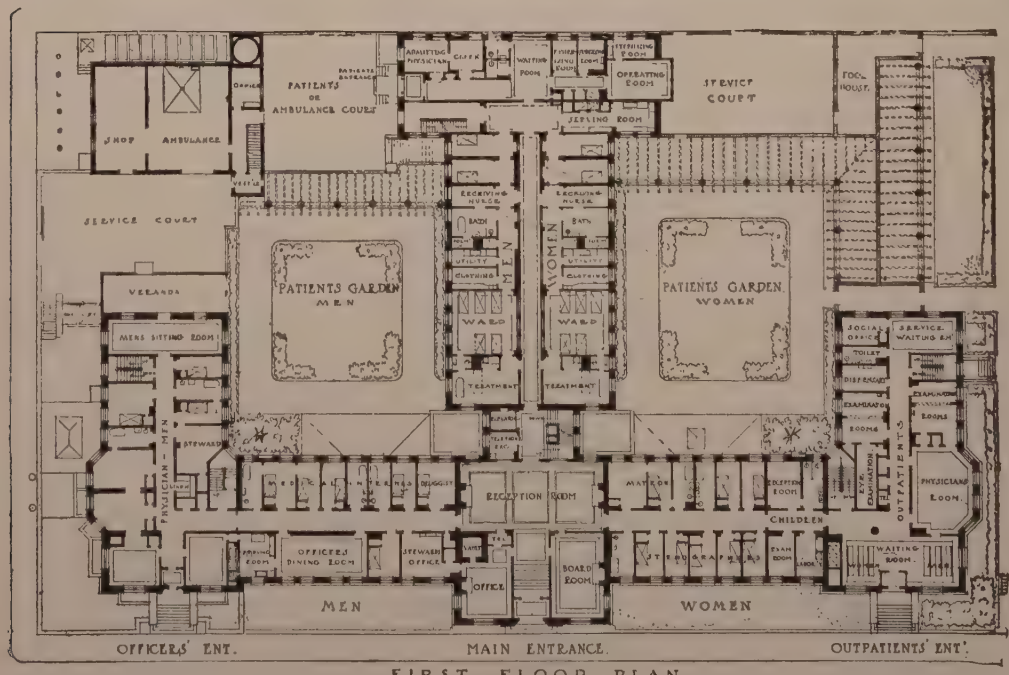



FIG. 301. Ground Floor




FIRST FLOOR PLAN

FIG. 302

MASSACHUSETTS PSYCHOPATHIC HOSPITAL, BOSTON, MASS.
Kendall, Taylor & Co., Architects

The details of construction are most carefully worked out. The door frames are of iron, with no projection; all door handles are turned down, affording no way to cause injury; all cabinets are of steel, placed flush with the wall; the telephones are enclosed in cabinets, and signal is given by a red light, no bells being used.

In the Psychiatric Clinic of the State University of Utrecht, Holland (Figs. 295-299), Professor Heilbronner has worked out some excellent ideas. One hundred patients are accommodated and all are placed on the first floor which is divided into six sections—three for women and three for men—and classified according to condition.

SECOND FLOOR PLAN

FIG. 303. MASSACHUSETTS PSYCHOPATHIC HOSPITAL, BOSTON, MASS.
Kendall, Taylor & Co., Architects

The offices, laboratories, etc., are located on the second and third floors of the main building.

While this is strictly a pavilion type of hospital, all sections are connected by a common corridor, adjoining which is the working or domestic side of the institution, the kitchens, dining-room, together with lecture rooms, etc. Each one of the patients' sections is supplied with the necessary utensils and equipment; each has an examining room, so arranged with curtains that it can be changed into a dark room; also a linen room, store room, sink room, tea kitchen, bath rooms, day room, and airing balcony.

THIRD FLOOR PLAN

FIG. 304

FOURTH FLOOR PLAN

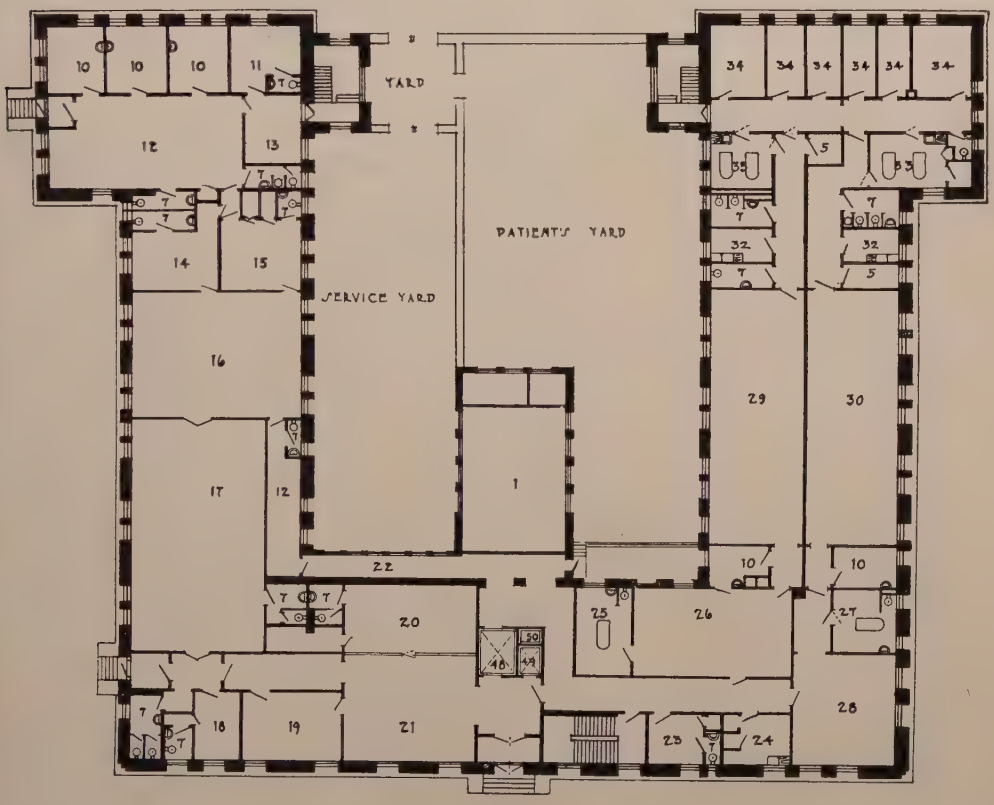
FIG. 305

MASSACHUSETTS PSYCHOPATHIC HOSPITAL, BOSTON, MASS.
Kendall, Taylor & Co., Architects

The bath rooms are centrally located and can be reached readily from the wards or single rooms. For the convenience of the wards, a corner water-closet is provided, so screened as not to be objectionable, at the same time keeping the patients under the surveillance of the attendant.

There are no large wards in any section, six beds at most.

In the neurological section, where less surveillance is needed, the rooms are separated by single doors; while in the psychiatric sections




First Floor Plan

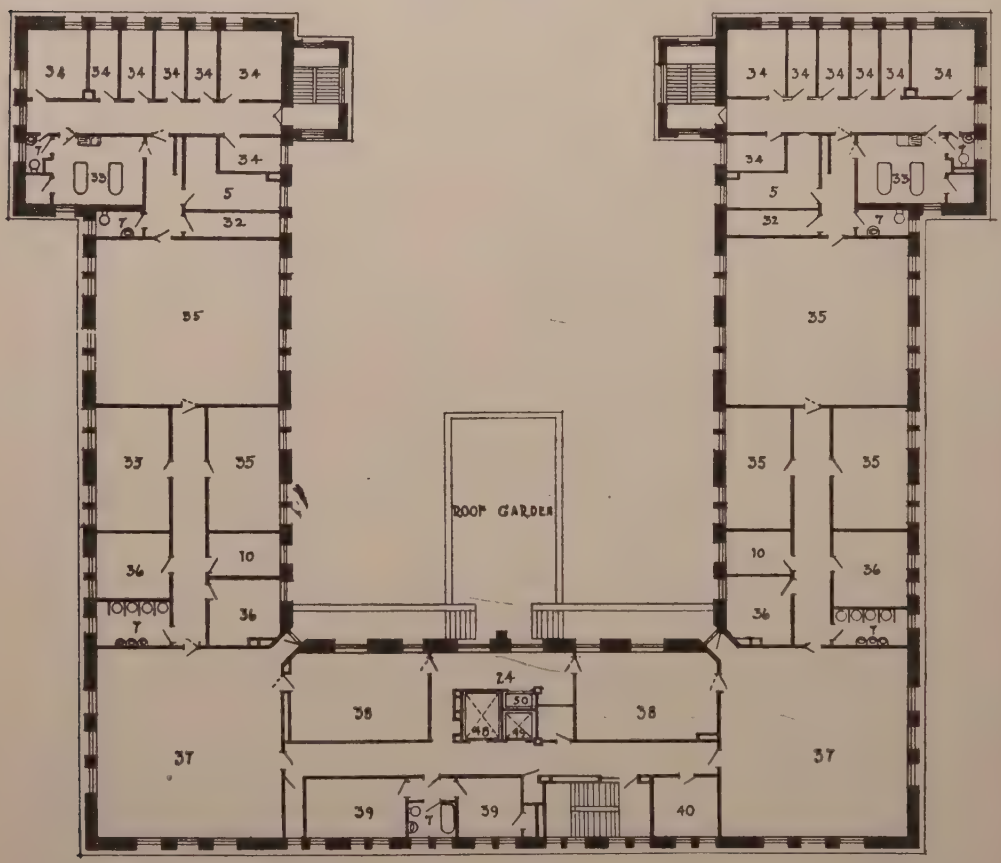
FIG. 306. PSYCHOPATHIC BUILDING, COOK COUNTY HOSPITAL, CHICAGO, ILL.
Richard E. Schmidt, Garden & Martin, Architects

the wards are divided by large sliding doors, making it easier for the night watch.

In the psychiatric sections, three baths to every thirteen beds are provided. The control for these baths is behind locked cabinet doors, and if the temperature of the water varies beyond certain limits an electric alarm summons an attendant.

In each psychiatric section is provided an isolation room with rounded corners, fastened-down toilet, protected lights, and protected double doors with an observation window. The windows are made of swinging sash, divided by heavy reinforced sash and glazed with heavy plate glass. The floors are covered with linoleum.

The administration offices, the laboratories, and the sleeping quarters for the attendants are on the second and third stories.




Courtesy, *The Modern Hospital*

Typical Floor Plan

FIG. 307. PSYCHOPATHIC BUILDING, COOK COUNTY HOSPITAL, CHICAGO, ILL.
Richard E. Schmidt, Garden & Martin, Architects

A large photographic gallery is arranged for cinematography, and has special lights arranged for night photography.

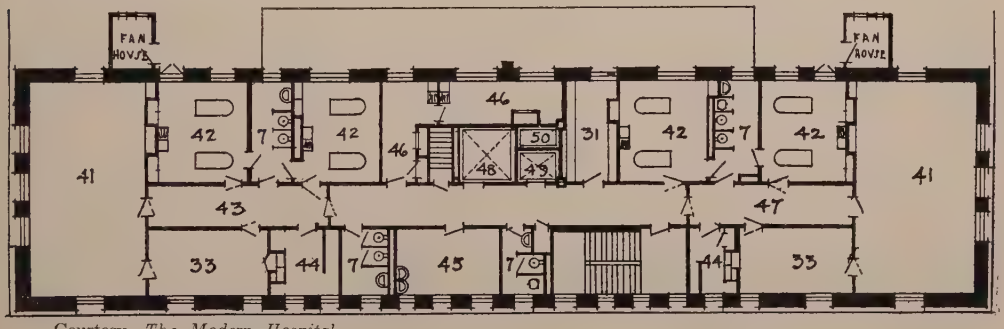
In this country the first psychiatric hospital, especially designed for the purpose, was that of the University of Michigan, at Ann Arbor, built in 1906. It has a capacity of sixty-two beds.

In 1911 the State of Massachusetts appropriated the sum of six

hundred thousand dollars, to be expended in the building of the Massachusetts Psychopathic Hospital, in the City of Boston. The site selected was in what has come to be known as the "hospital district" of Boston, located in close proximity to the Harvard Medical School, the Peter Bent Brigham Hospital, the Infants', the Children's, the Good Samaritan, the New England Deaconess, the Robert Brigham, the Channing, the Huntington and other hospitals.

The development of this institution in Massachusetts has given the State a magnificent psychopathic building which forms the clearing-house, as it were, for the larger insane institutions throughout the state.

The building is E-shaped, a plan giving the greatest number of rooms exposed to the best light and air. It is four stories in height and will accommodate one hundred and ten patients. The patients are generally admitted at the ambulance entrance on the first floor, leading from the side street.




Courtesy, *The Modern Hospital*

FIG. 308. PSYCHOPATHIC BUILDING, COOK COUNTY HOSPITAL, CHICAGO, ILL. HYDROTHERAPEUTIC DEPARTMENT ON TOP FLOOR

Richard E. Schmidt, Garden & Martin, Architects

On the first floor (Fig. 302) there are two admitting units, one for each sex, divided by a general corridor. These units consist of two admitting wards of five beds each, general treatment rooms, baths, isolation rooms, etc. Connected with this section are the operating and emergency department and the offices for the admitting officers. The remainder of the first floor is occupied by offices and quarters of administration, matron, and staff, and the out-patient department, containing waiting-room, examining room, rooms for social service workers, etc.

What might be termed the patients' building is separated from the main building by a short connecting corridor containing the elevator and staircase. The wards for the men are placed on the second

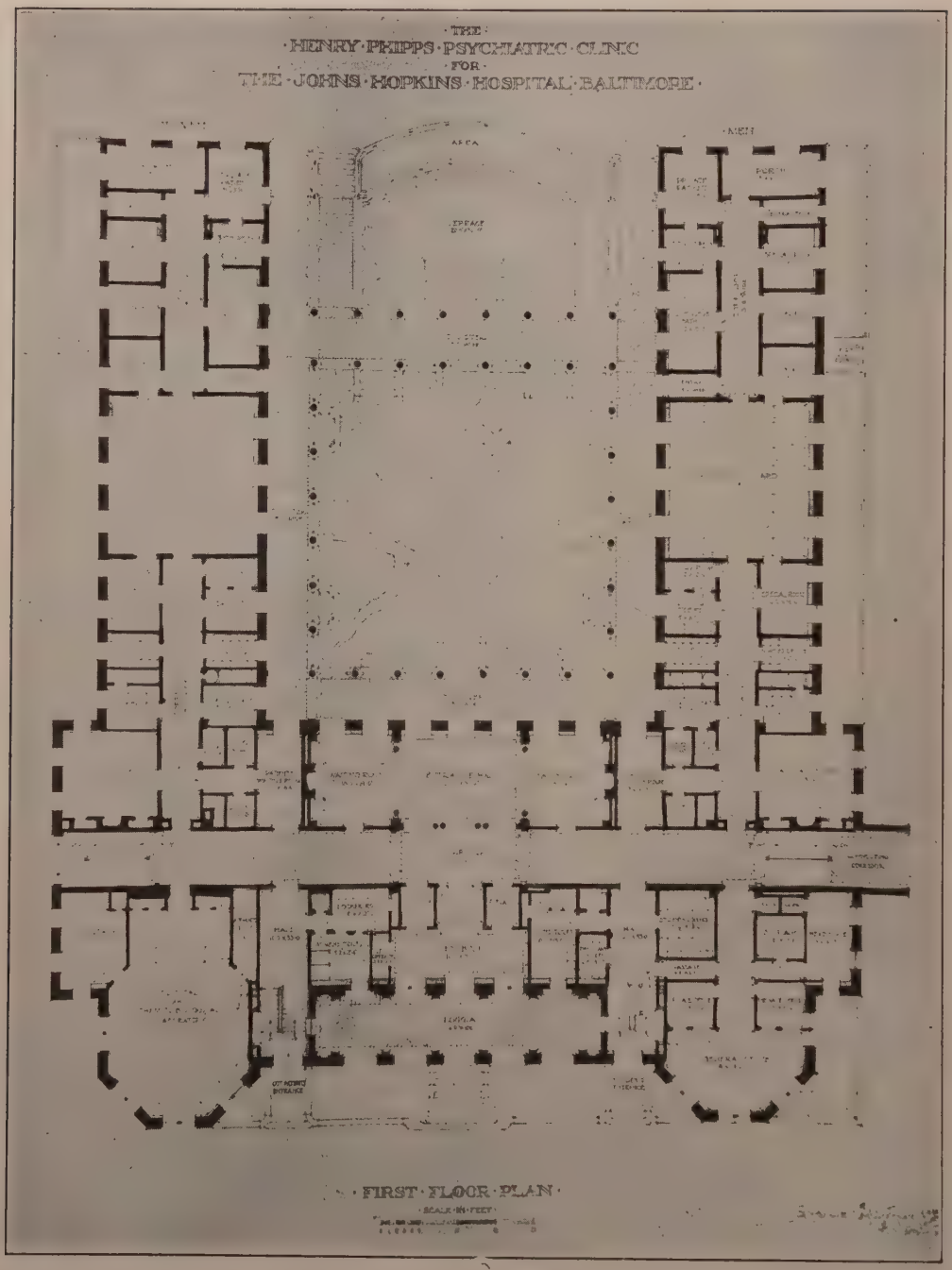



FIG. 309. FIRST FLOOR—HENRY PHIPPS PSYCHIATRIC CLINIC, JOHNS HOPKINS HOSPITAL, BALTIMORE, MD.
Grosvenor Atterbury, Architect

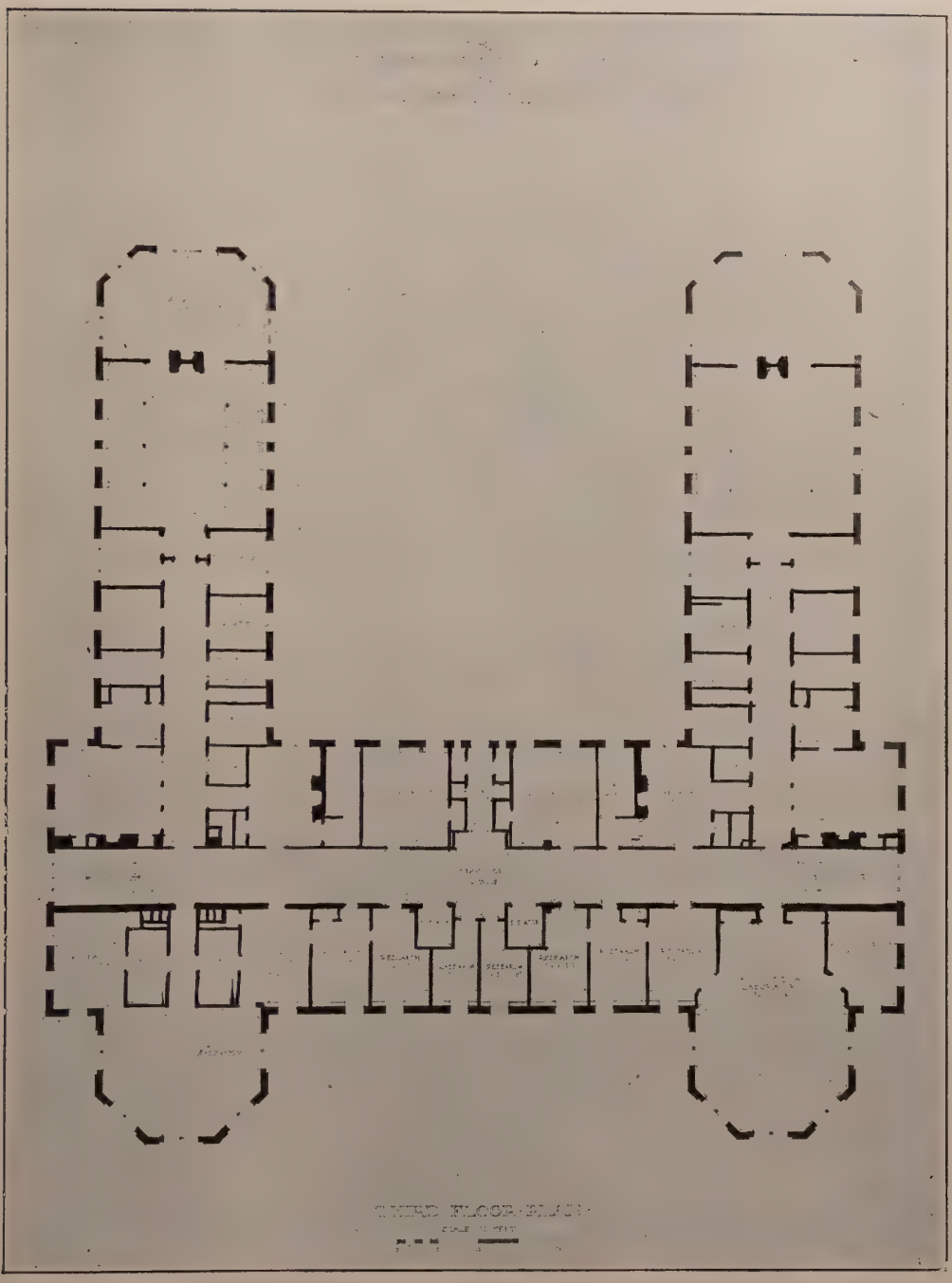


FIG. 310. THIRD FLOOR—HENRY PHIPPS PSYCHIATRIC CLINIC, JOHNS HOPKINS HOSPITAL, BALTIMORE, MD.
Grosvenor Atterbury, Architect

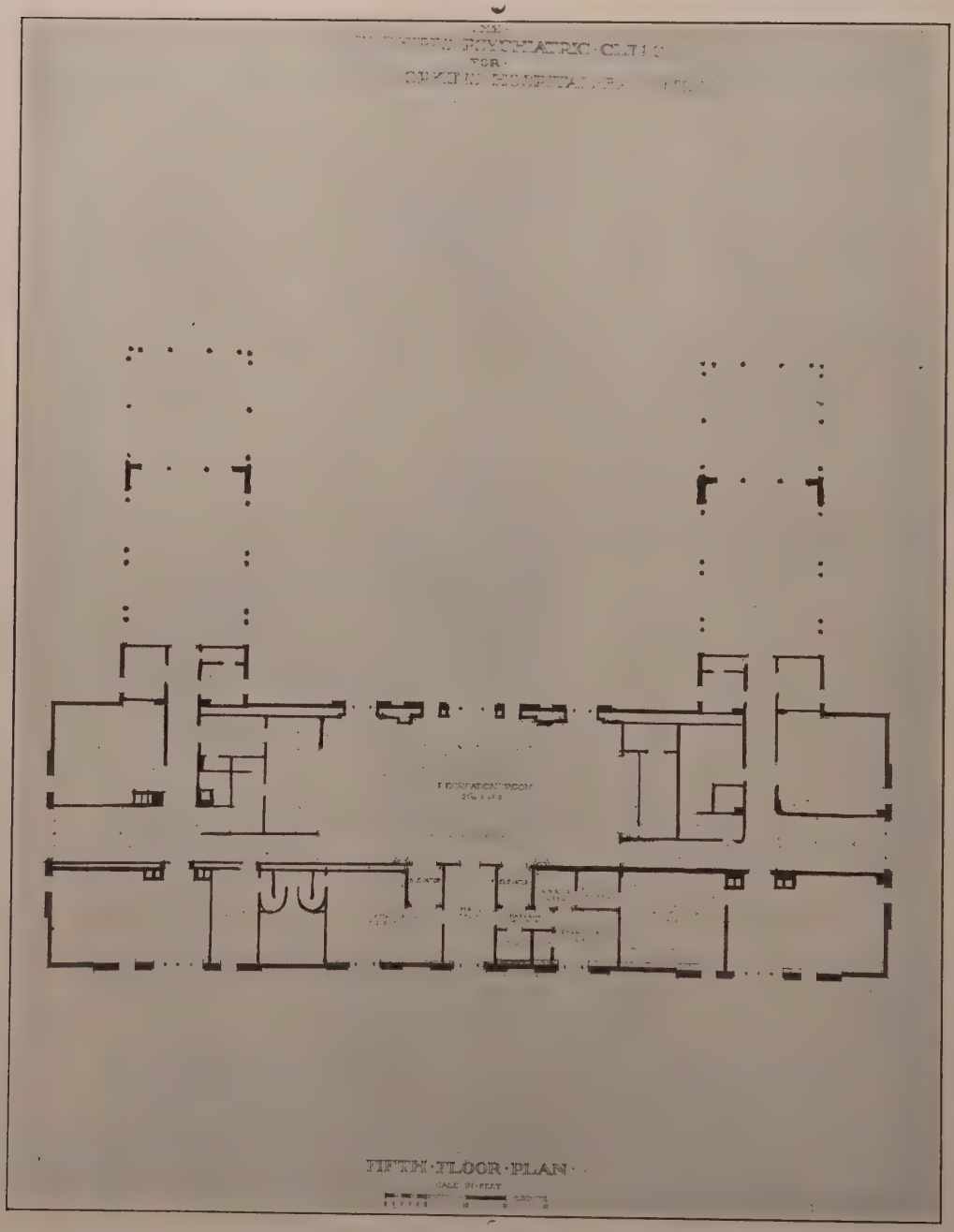



FIG. 311. FIFTH FLOOR—HENRY PHIPPS PSYCHIATRIC CLINIC, JOHNS HOPKINS HOSPITAL, BALTIMORE, MD.
Grosvenor Atterbury, Architect

FIG. 312. HENRY PHIPPS PSYCHIATRIC CLINIC, JOHNS HOPKINS HOSPITAL, BALTIMORE, MD.
Grosvenor Atterbury, Architect

floor and those for the women on the third floor (Fig. 304). Each has a section for disturbed cases, divided into separate rooms for each patient.

As in the foreign hospitals previously described, the continuous bath is used largely in the treatments.

Each ward unit has its own serving kitchen, and bath and toilet unit.

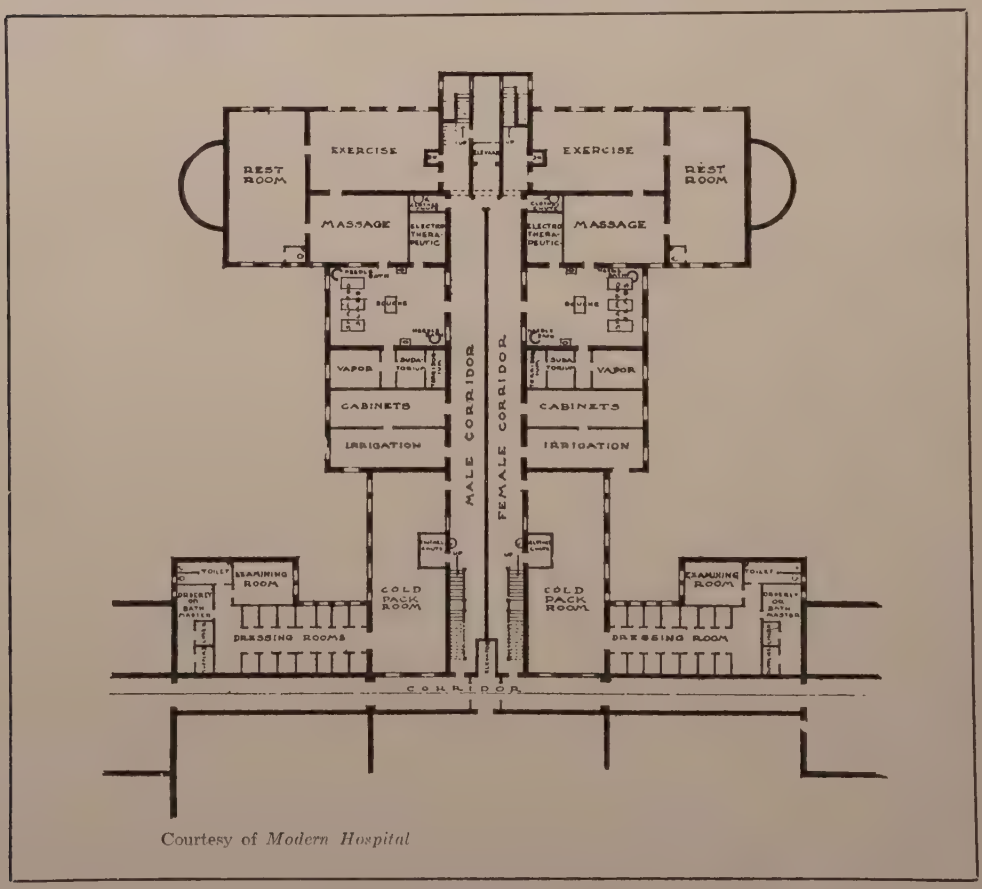
A large out-door day-room on the roof (Fig. 305) affords opportunity for exercise and recreation, and as this institution overlooks the splendid park system of the city the patients have much outside of themselves to occupy their minds.

The PHIPPS CLINIC, a well-studied psychopathic department of the Johns Hopkins Hospital, shows much care and thought, not only in the planning but in the æsthetic side of hospital architecture. The restricted area made it necessary for the architect to carry the building five stories above the basement in order to provide for the needs of the department. For description, the writer is indebted to Adolph Meyer, M.D.* (Figs. 309-312).

*"The Modern Hospital," Vol. I, No. 2.

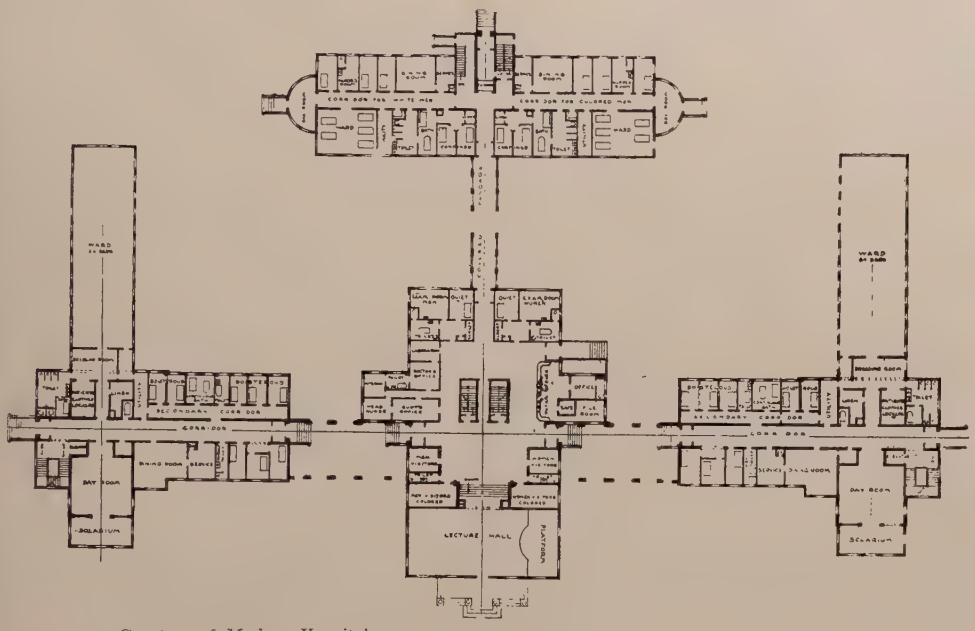
Courtesy of *Modern Hospital*

FIG. 313. GALLINGER MUNICIPAL HOSPITAL, WASHINGTON, D. C.



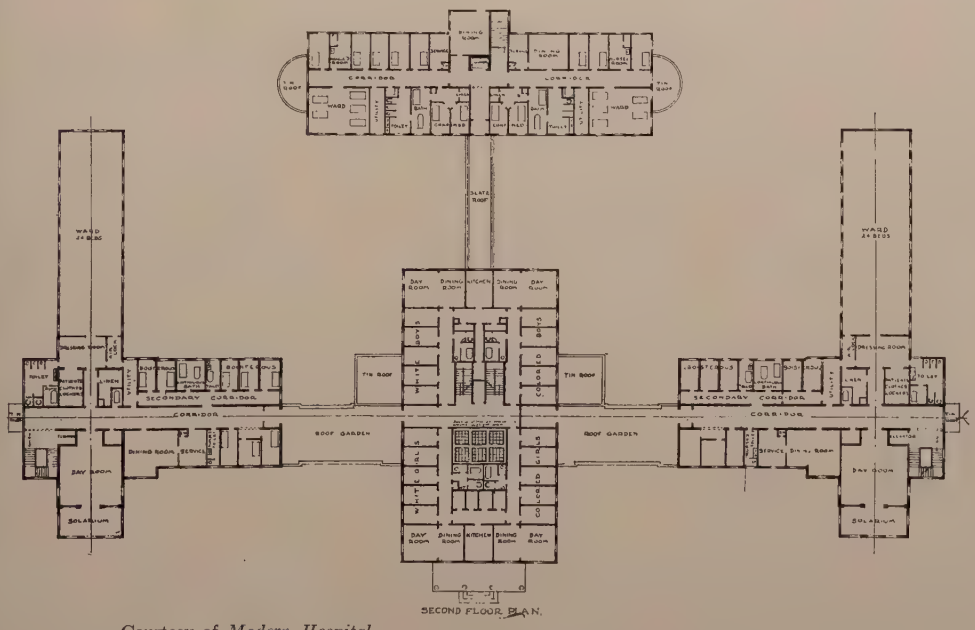

Courtesy of *Modern Hospital*

FIG. 314. BASEMENT, GALLINGER MUNICIPAL HOSPITAL, WASHINGTON, D. C.




Courtesy of *Modern Hospital*

FIG. 315. FIRST FLOOR, GALLINGER MUNICIPAL HOSPITAL, WASHINGTON, D. C.




Courtesy of *Modern Hospital*

FIG. 316. SECOND FLOOR, GALLINGER MUNICIPAL HOSPITAL, WASHINGTON, D. C.

There is an out-patients' department, with waiting room, which also is used in part for occupation classes, social workers, and examining rooms.

In the hospital division there is an admission ward, with provision for excited cases, as well as a semi-quiet ward, a quiet ward, and a private quiet ward. A number of well arranged, exclusively private suites and rooms are provided.

The administrative portion is principally on the north, consisting of offices for administration, laboratory and staff quarters.

The medical treatment department consists of hydrotherapy and mechanotherapy.

The top floor is reserved for the large recreation hall and roof gardens, charmingly designed and colored.

The ward unit consists of an eight-bed ward.

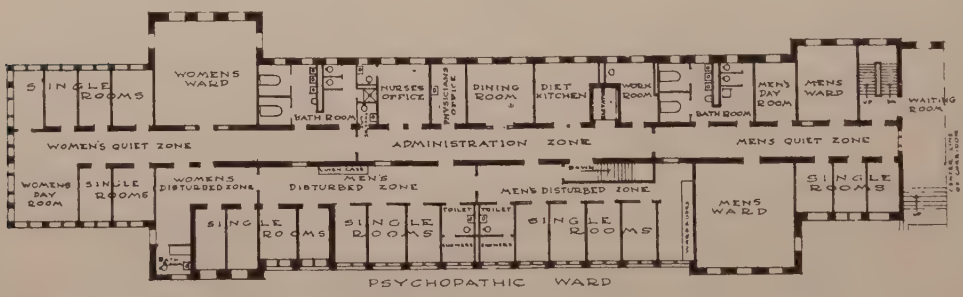



FIG. 317. PSYCHOPATHIC DEPARTMENT, BUFFALO CITY HOSPITAL, BUFFALO, N. Y.
Courtesy, *Modern Hospital*

The psychopathic building of the Cook County Hospital, Chicago, Illinois (Figs. 306-308), is well planned. The general scheme is not unlike that of the Boston Psychopathic.

The psychopathic building of the Gallinger Municipal Hospital, Washington, District of Columbia (Figs. 313-316), is in connection with a city hospital built and controlled by the United States Government. It is a group of four buildings connected by short corridors. Separate provision is made for white and colored patients and for men, women and children. Hydrotherapy is featured, as an essential part of the treatment. Occupational therapy is also carried on. It is considered a well-planned group.

In the Buffalo City Hospital, Buffalo, New York (Figs. 317, 318), the psychopathic department is housed on the ground floor of a ward building. It is, like the Boston Psychopathic, a receiving department, for observation pending a full diagnosis and discharge or removal to a state institution. The zones for disturbed patients are

exceptionally well planned and flexible, the walls are sound-proofed and the doors are double. Provision is made for hydrotherapy.

The psychiatric department of the Ottawa Civic Hospital, Ottawa, Canada (Fig. 85), is on the ground floor of a general hospital. There are but six rooms; but it is planned with the details of window guards, non-projecting hardware, concealed door handles, etc., such as are used in mental hospitals. There is a small servery, a utility room, and provision for continuous baths. The nurses' station commands a view of all the rooms.

Courtesy of *Modern Hospital*

FIG. 318. HYDRO-THERAPY ROOM, BUFFALO CITY HOSPITAL, BUFFALO, N. Y.

# CHAPTER XI

## THE TUBERCULOSIS DEPARTMENT

THE care of patients afflicted with pulmonary tuberculosis demands special study for the problem is totally different, from almost every point of view, from that of the treatment of the general patient, whether surgical, medical, or contagious, in the number of gradations of patients and the different care required for each grade.

If we are to plan for the care of tuberculosis patients on the grounds of the general hospital, then a portion of the site should be selected remote from the other patients' buildings, but with equal regard to sunlight and protection from the cold winds. If, as is more likely to be the case, the tuberculosis hospital or sanatorium is to be isolated and an institution by itself, and a site is selected remote from water, sewage, and other municipal service, then the problems are increased many fold, and the natural contour, the nature of the land, and the meteorological conditions must be carefully studied.

FIG. 319. REVOLVING AIRING BALCONY, AMSTERDAM HOSPITAL, AMSTERDAM HOLLAND

If planning for "all comers," it will be necessary to plan on about fifty per cent of the patients being of the ambulatory class, who are able to be up and about and to do light work. Plans must be made for ground room for exercise and recreation, buildings for light industrial work, buildings for dining and entertainment rooms, facilities in other wards for carrying on the various activities of life under hygienic and supervised conditions, the main aim being to have the maximum amount of sunshine, fresh air, and absolute ventilation.

The area of land must not be restricted and it should have level stretches about the buildings. The outlook and general environment are almost as important as sunlight and ventilation—e. g., an otherwise beautiful site might lose much of the therapeutic value if a cemetery were in the immediate foreground, or if situated near noisy manufacturing plants or smoking chimneys.

The average incipient patient soon wearies of his enforced confinement; and unless the natural attractions are considered he becomes discontented and leaves.

FIG. 320. SOLARIUM ROOF, DR. ROLLIER'S CLINIC AT LEYSIN
Courtesy, *Modern Hospital*

In providing service for tuberculosis cases they may be roughly divided into four general groups:

1st—Those in the last stages, in many instances dying patients;

2nd—The acute but recoverable cases, who are in accordance with present methods, kept in bed until their temperature subsides;

3rd—The ambulatory cases, with incipient or even moderately advanced cases, incapable of regular work yet enjoying a reasonable degree of health;

4th—The out-patient who, while needing treatment through the day, may return to his home at night under proper supervision.

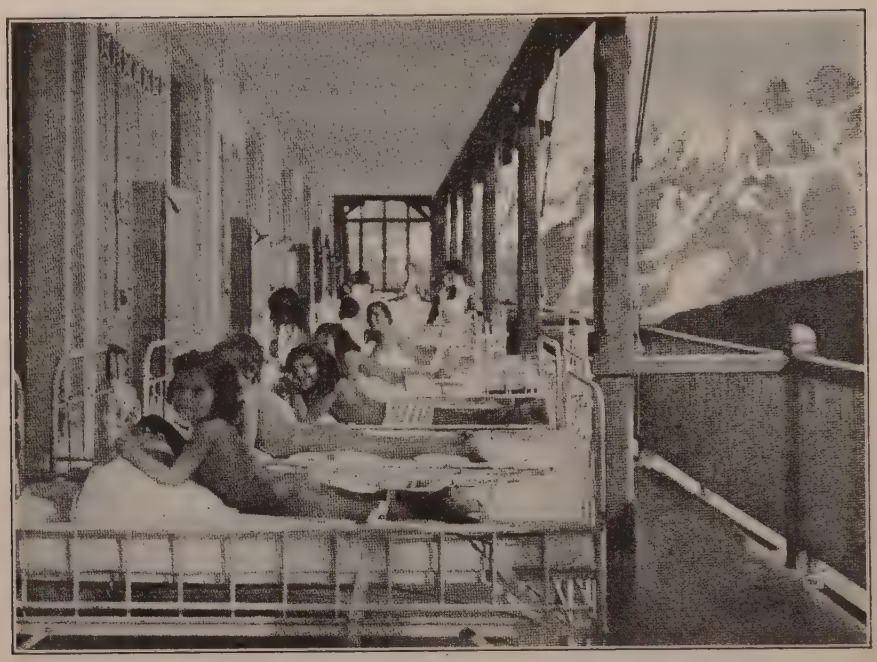


FIG. 321. BALCONY, DR. ROLLIER'S CLINIC AT LEYSIN
Courtesy, *Modern Hospital*

For the treatment of the first class, wards or private rooms not unlike other medical wards or private rooms should be provided.

Proper care must be exercised for the protection of the nurse and the prevention of the spread of disease.

For the comfort of the patients the wards should not be too large: if subdivided by permanent screens they may become less depressing. Everything possible should be done to brighten the ward, and there should be provided a wealth of sunshine and plenty of out-of-door balconies.

As the death rate in these wards will naturally be greater than in any other part of the institution, the method of removing the body from the building so as to attract the least attention should be studied. If the morgue can be at some little distance from the wards, with an underground connection, much mental suffering will be avoided.

The acute cases should be in outdoor wards or in rooms well open to the air, much as the ambulatory cases are. Nursing facilities must be provided for them, however, practically the same as those for the third-stage cases, since in many institutions these patients are not allowed to get out of bed.

For the ambulatory case the problem is very different. Here there

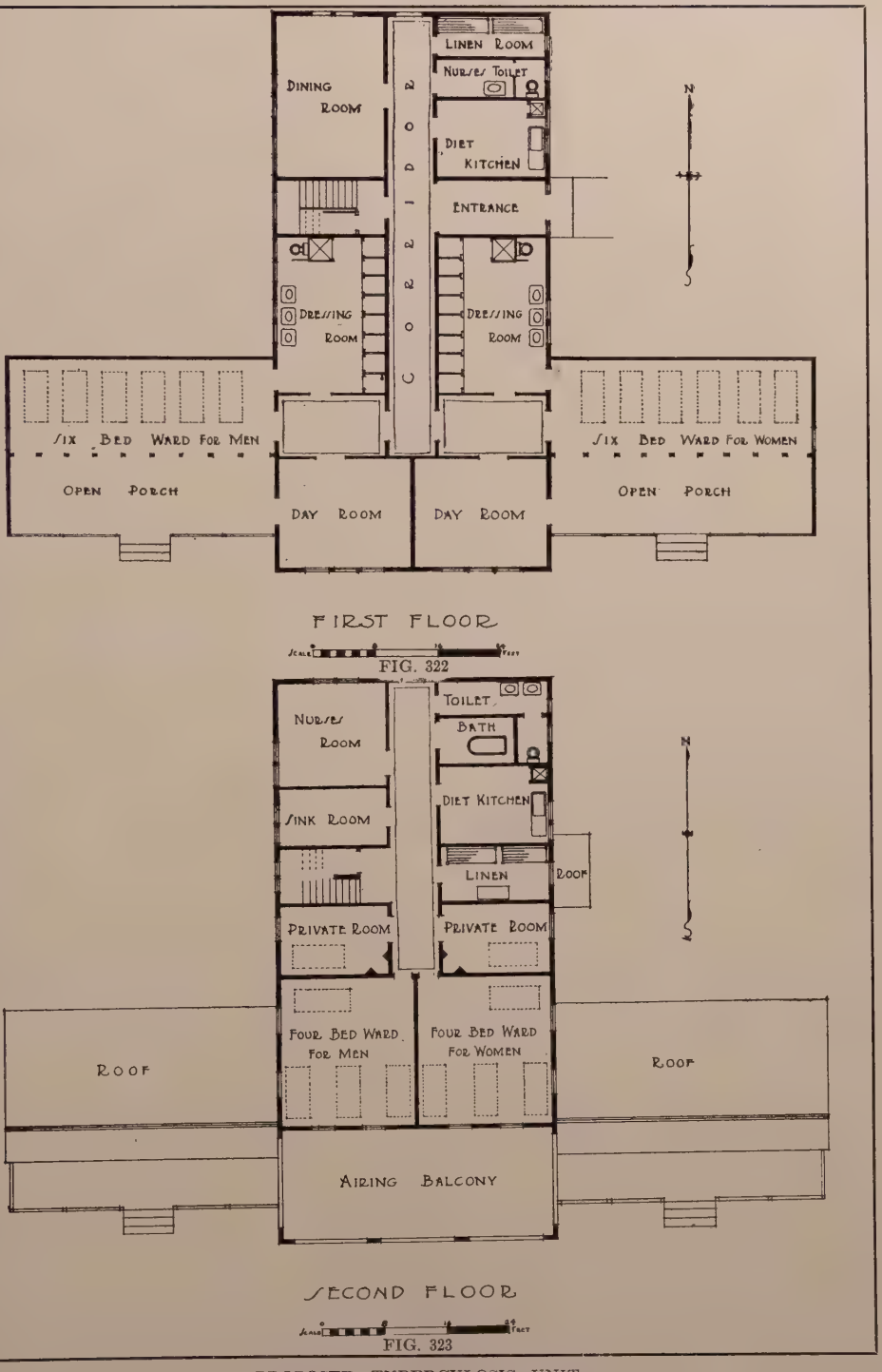



FIG. 322

FIG. 323

PROPOSED TUBERCULOSIS UNIT

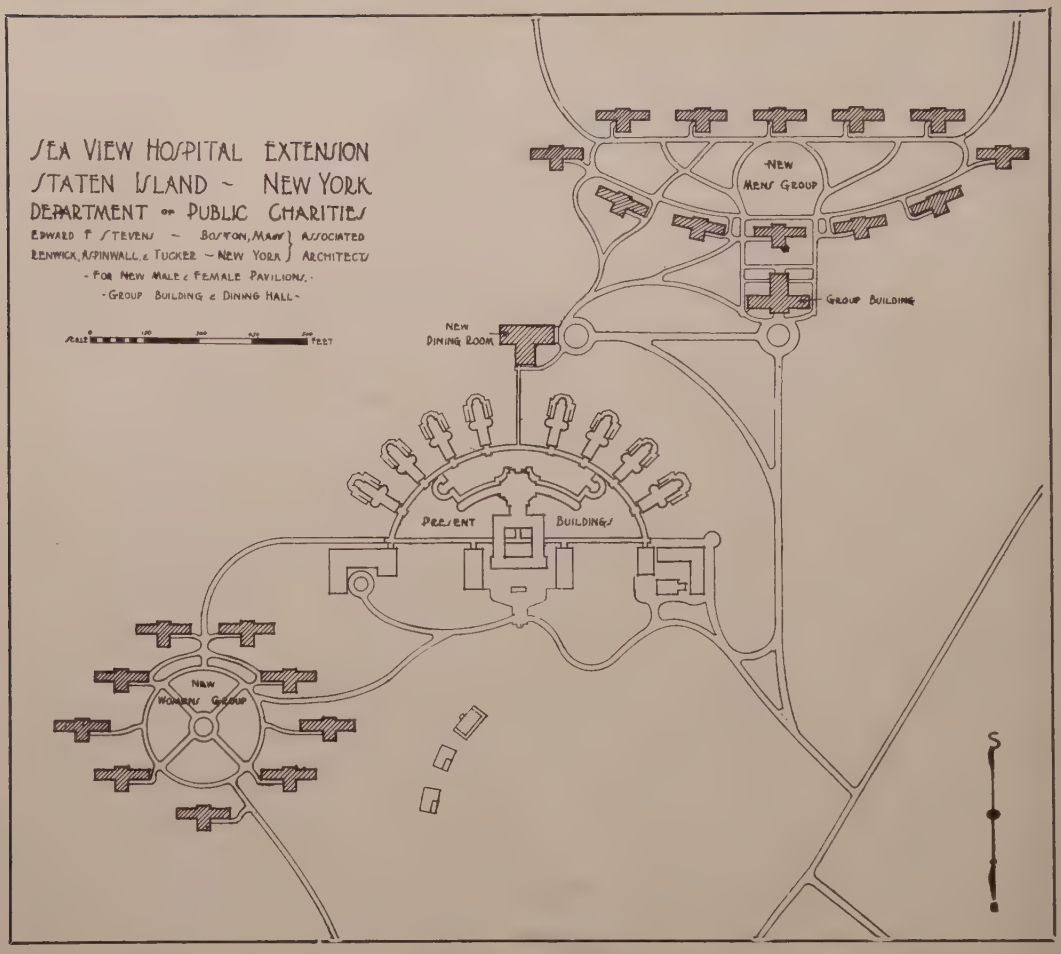

SEA VIEW HOSPITAL EXTENSION
STATEN ISLAND ~ NEW YORK
DEPARTMENT OF PUBLIC CHARITIES
EDWARD F STEVENS ~ BOSTON, MASS } ASSOCIATED
RENWICK, ASPINWALL & TUCKER ~ NEW YORK } ARCHITECTS
~ FOR NEW MALE & FEMALE PAVILIONS, ~
~ GROUP BUILDING & DINING HALL ~
SCALE FEET
NEW MENS GROUP
GROUP BUILDING
NEW DINING ROOM
PRESENT BUILDINGS
NEW WOMENS GROUP

FIG. 324. PLOT PLAN

are patients who are up and dressed and active to a certain degree, but for whom there must be provided proper sleeping quarters, with due regard to the out-of-door treatment recommended for this class. There must also be dressing and bath rooms which can be warmed in cold weather, recreation rooms for stormy weather, recreation parks for pleasant weather, and light employment for certain hours. Every ambulatory patient should have a cupboard, locker, or closet, which will be large enough to be entered and to contain his personal belongings. This cupboard should be well lighted, well ventilated, and well heated; for to the lonely man away from family and friends this may be the only place which he may call his very own. Such a cupboard should not be less than three by four feet in size, and should contain a seat, shelves, mirror, and any other conveniences which experience may dictate.

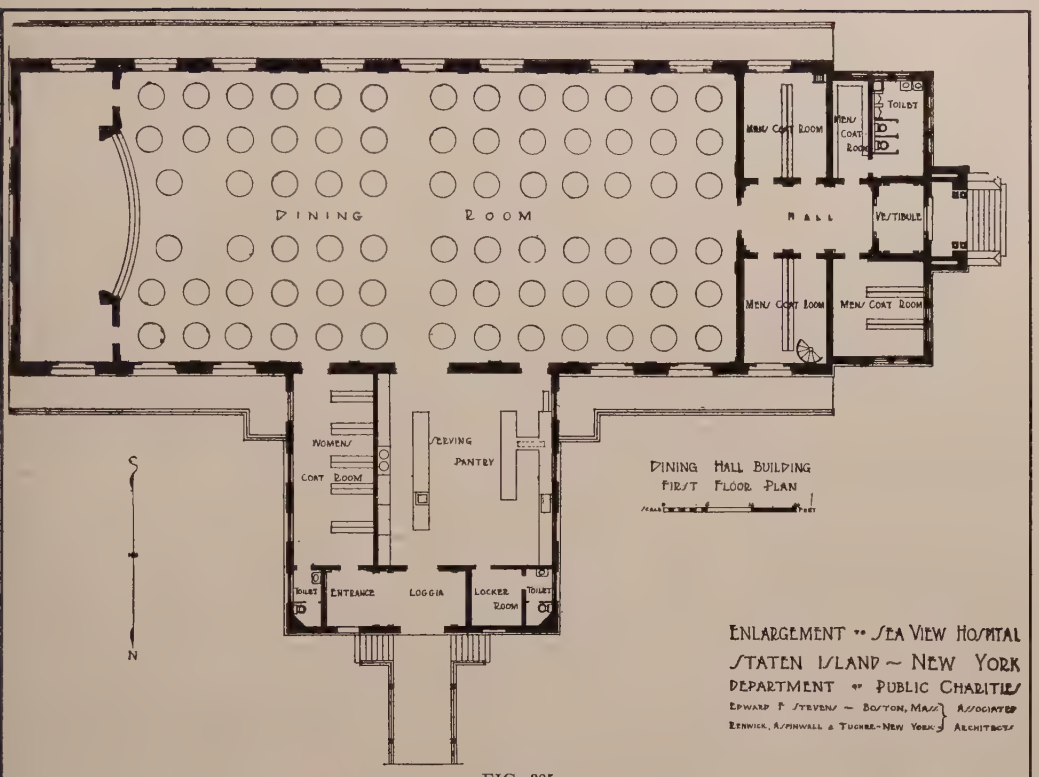



FIG. 325

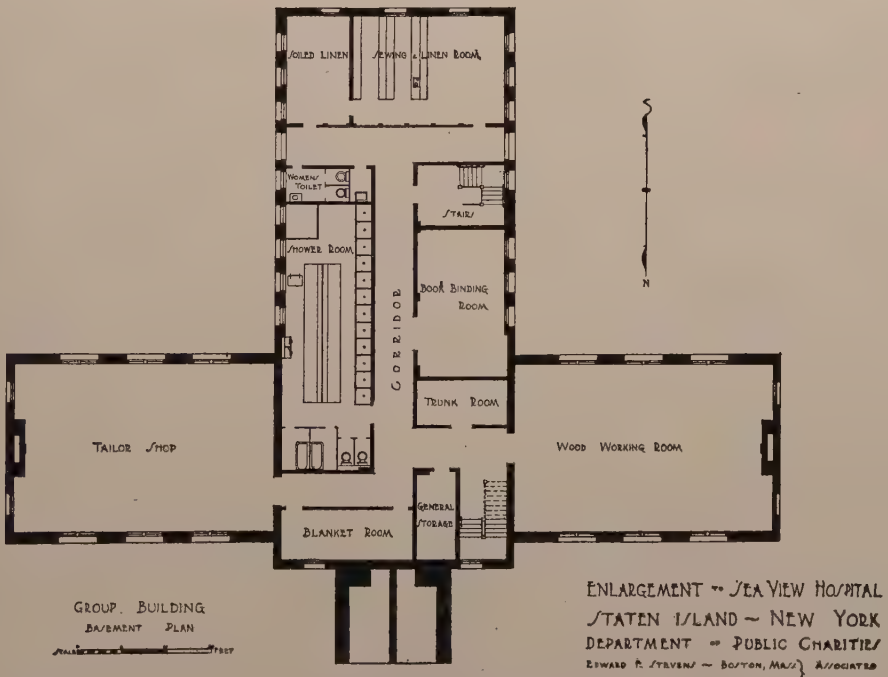



FIG. 326

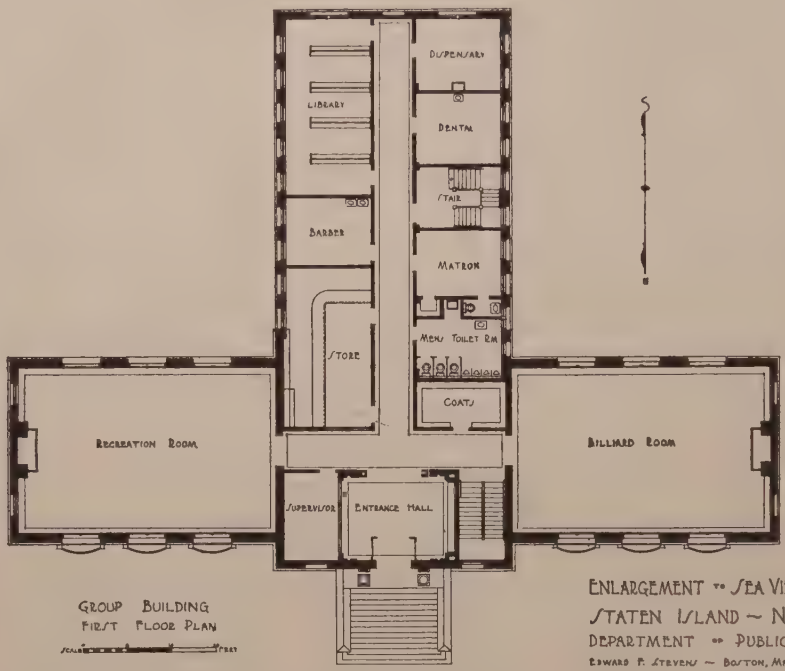



FIG. 327

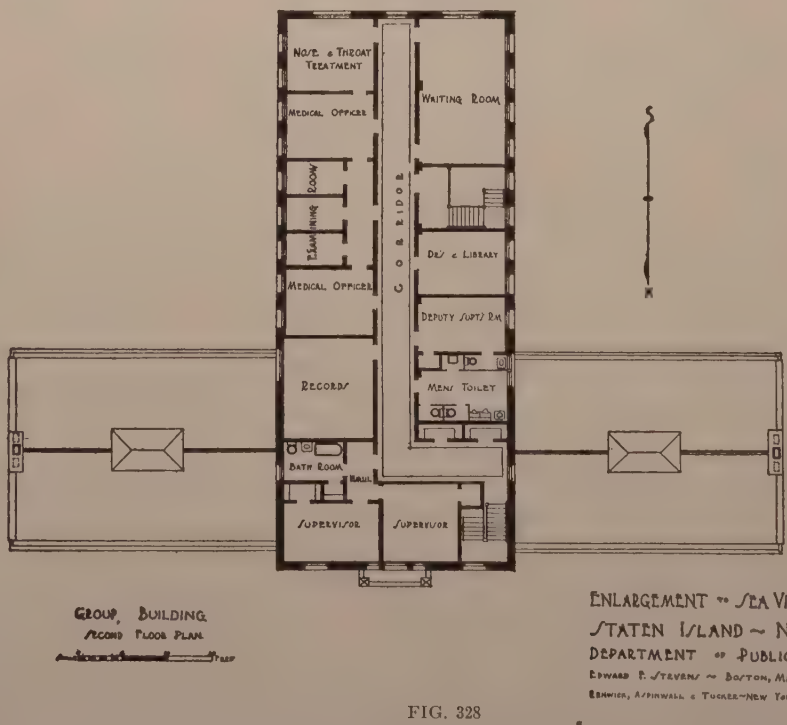



FIG. 328

The toilets should be of sufficient size to accommodate the patients of the particular unit which they serve, and should be reasonably near the sleeping quarters.

The general room or day room should be light and cheerful, as it is the living-room of the family or the unit which it serves.

The sleeping quarters can be in wards, with beds on either side, with plenty of windows to open, or of the "tent" or "shack" form, open toward the south, with beds to the north. The modification of the shack has become perhaps the most popular form for the housing of incipients, for with this type the bed of the patient can be brought practically into the open when desired. The south can be closed with swinging sash or cloth screens, or can be left entirely open.

It is a fact that cheapness of shack construction has often led

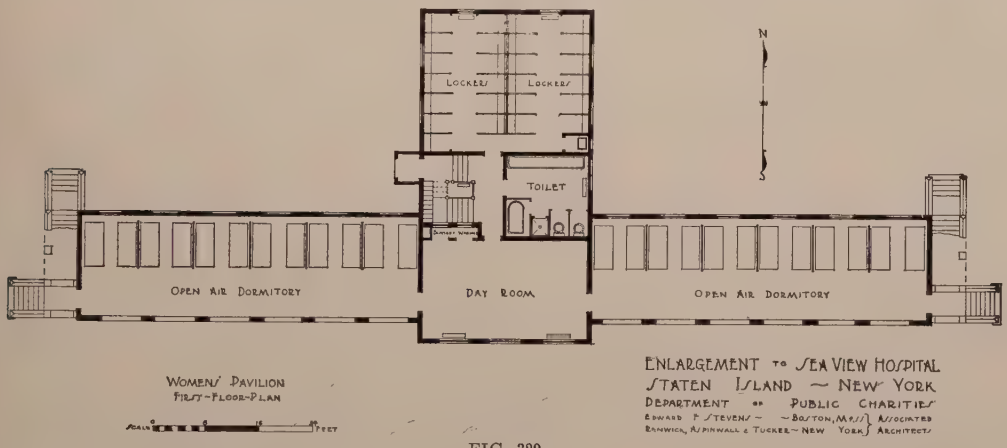



FIG. 329

committees to neglect to provide the necessary comforts. In nearly all places some provision must be made for cold weather, and for severe storms. In county tuberculosis sanitaria there is sure to be a considerable number of acute and advanced cases, who require nursing and some degree of comfort, and who cannot be properly cared for in shacks.*

*Heliotherapy.* The development within the past few years of the use of direct sun rays in the treatment of surgical or non-pulmonary tuberculosis has shown marked results. Such authorities as Dr. Rollier† of Leysin, Switzerland, and Dr. LoGrasso of Buffalo, New

*"The County Tuberculosis Sanitarium," in the Architectural Forum, June, 1919.

†From "Heliotherapy" by Dr. A. Rollier, published by Henry Frowde and Hodder & Stoughton, London.

York, have shown the effectiveness of the scientific application of the sun's rays on the exposed surface of the body; and the heliotherapy department of the tuberculosis sanitarium is now a definite and fixed form of treatment, with results which justify almost any reasonable expense.

Inasmuch as the treatment consists in exposing the nude body to sunlight and air, the equipment is fairly simple to provide. Since ordinary glass cuts out the therapeutic rays, the exposure must be made in the open air, with sufficient cover in the way of roof, awning or portable shield for protecting the patient's head or any portion of the body required.

While sunlight and air are necessary, plans should be made so as to protect the patient from cross drafts; this may be accomplished by screens at the end of a porch, or individual screens at the side of the beds, which allow a maximum of light and air.

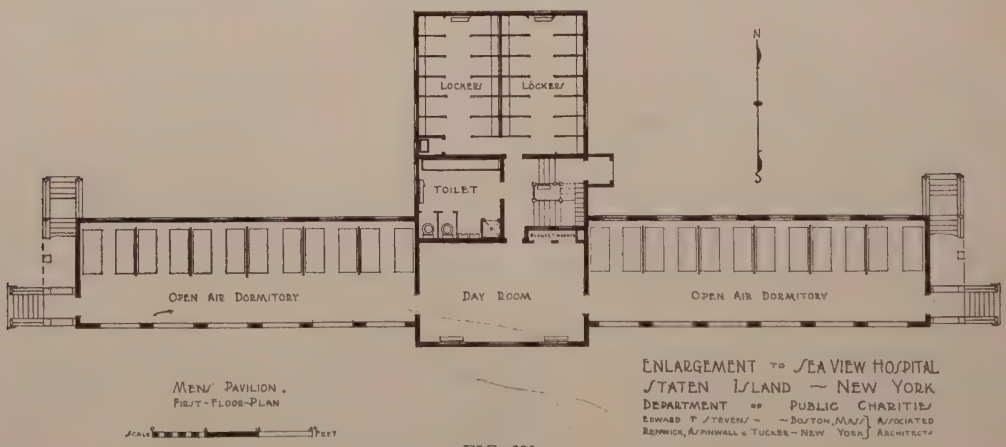



FIG. 330

Figs. 320 and 321 show simple arrangements for heliotherapy.

Nearly every tuberculosis hospital or sanatorium has its out-patient clinic, where the patient spends the day on the sunny lawn or broad terraces, receiving nourishing food and good advice for home living. For this work the principal equipment is steamer chairs, blankets, serving kitchens, and intelligent attendants. This educational and helpful work, followed up as it is by the social service work of the institutions, is accomplishing important results in the stamping out of the great white plague. The Boston Consumptives' Hospital, Mattapan, Massachusetts, is one of the institutions which does an extensive out-patient work.

In the large city and county institutions the industrial work of

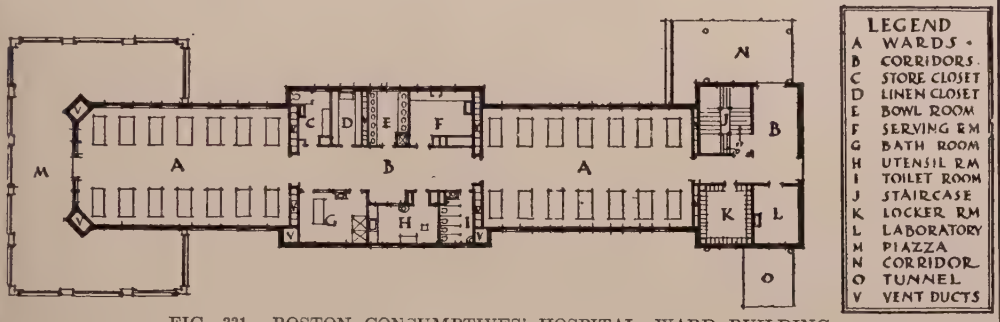



FIG. 331. BOSTON CONSUMPTIVES' HOSPITAL, WARD BUILDING
Maginnis & Walsh, Architects

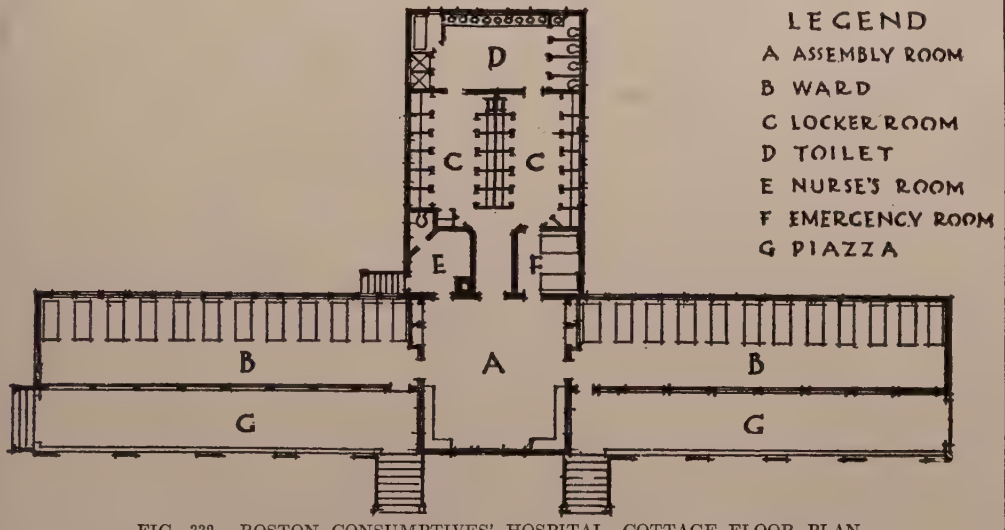



FIG. 332. BOSTON CONSUMPTIVES' HOSPITAL, COTTAGE FLOOR PLAN
Maginnis & Walsh, Architects

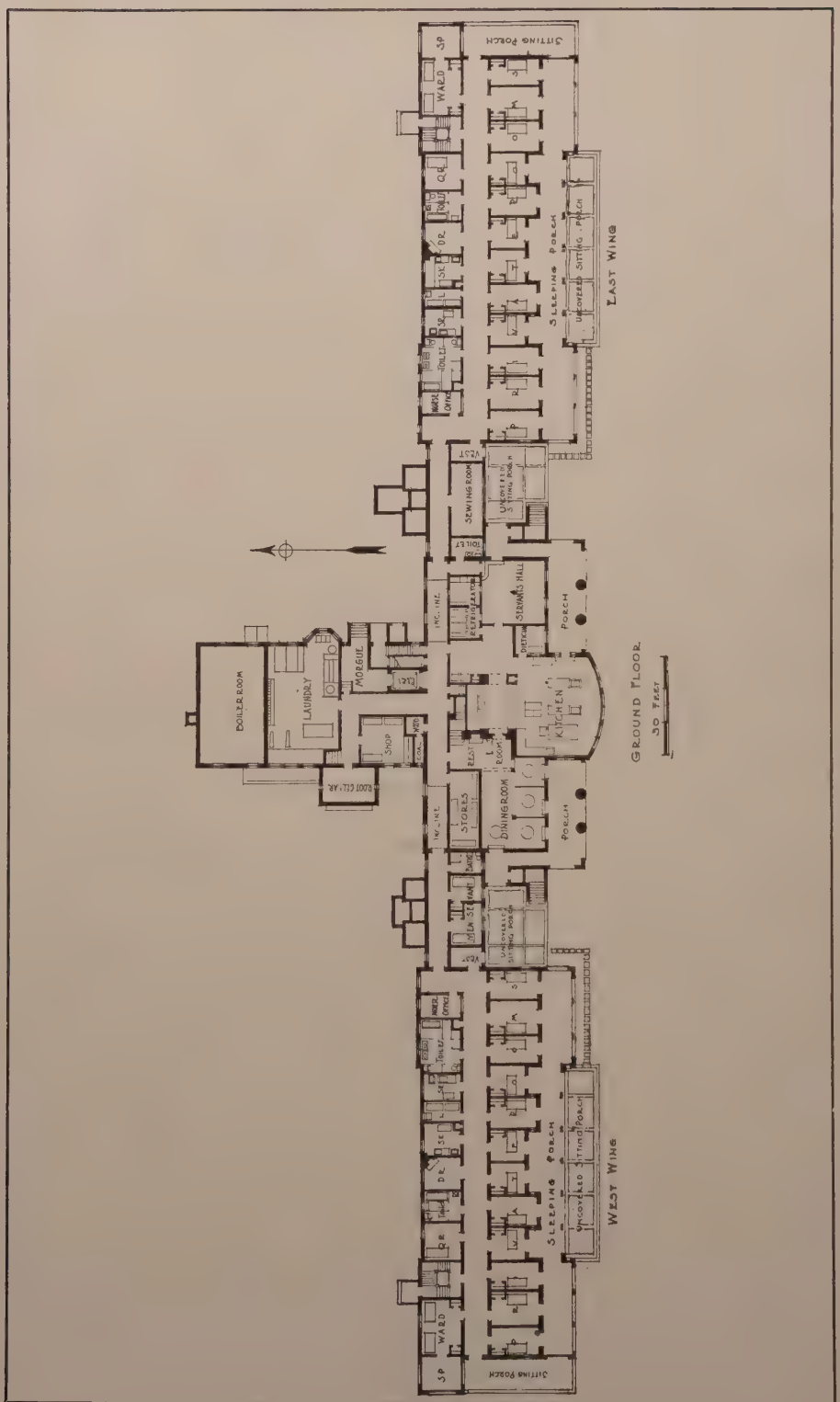



FIG. 333. CENTRAL NEW ENGLAND SANATORIUM, RUTLAND, MASS.
Edward F. Stevens, Architect

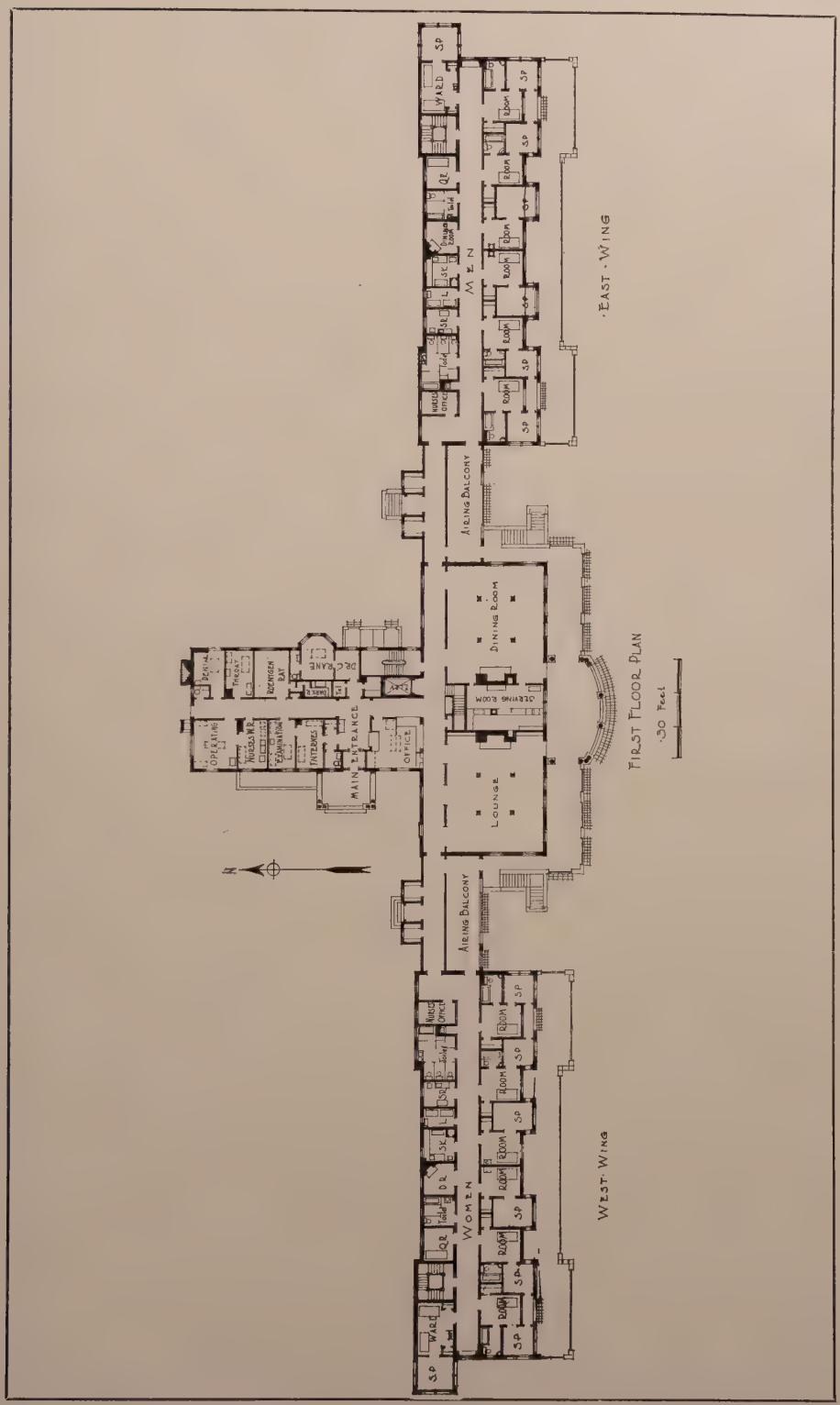



FIG. 334. CENTRAL NEW ENGLAND SANATORIUM, RUTLAND, MASS.
Edward F. Stevens, Architect

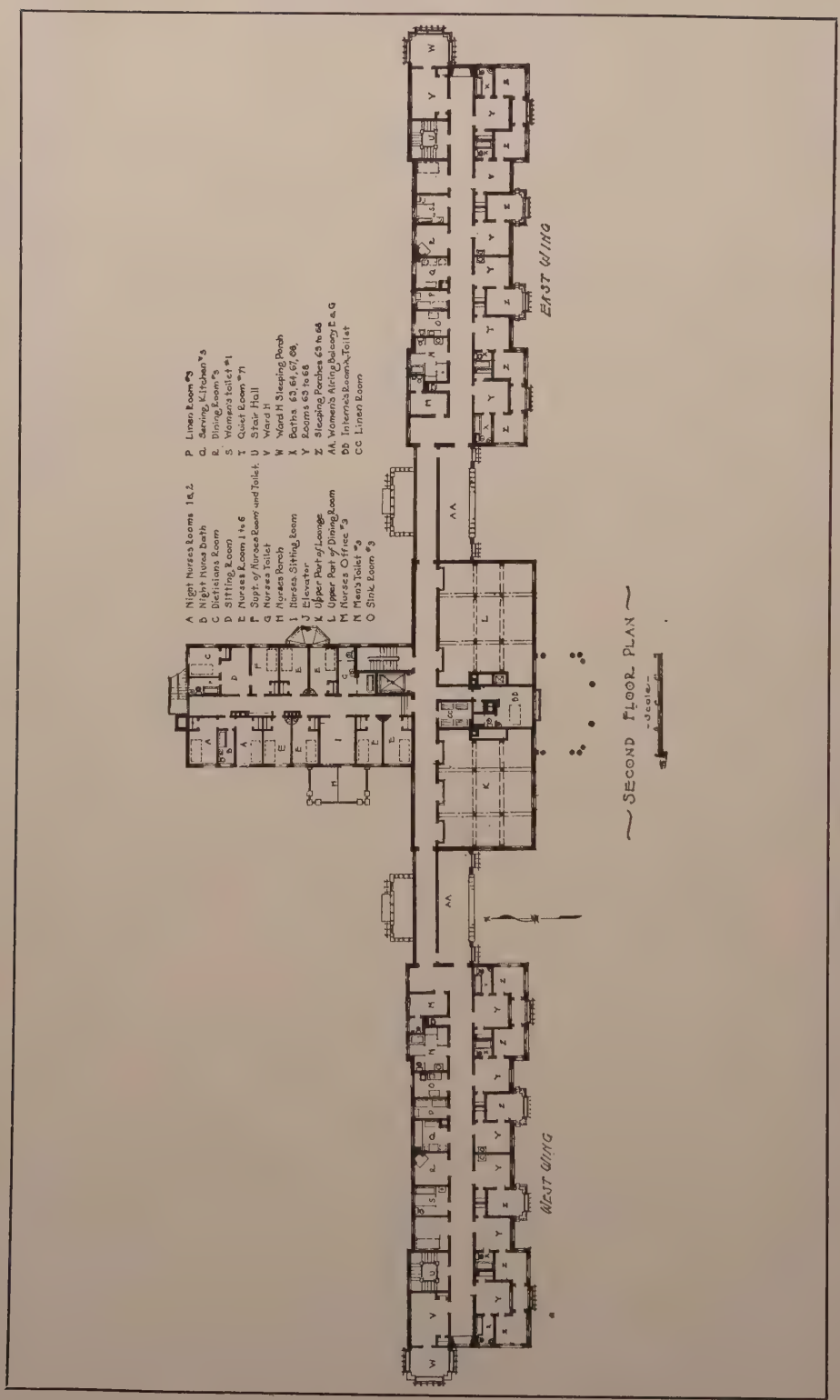

A Night Nurses Rooms 1&2
B Night Nurses Bath
C Dietitians Room
D Sitting Room
E Nurses Room 1 to 6
F Supt. of Nurses Room and Toilet
G Nurses Toilet
H Nurses Porch
I Nurses Sitting Room
J Elevator
K Upper Part of Lounge
L Upper Part of Dining Room
M Nurses Office #3
N Men's Toilet #3
O Sink Room #3
P Linen Room #3
Q Serving Kitchen #3
R Dining Room #3
S Women's Toilet #1
T Quiet Room #7
U Stair Hall
V Ward H
W Ward H Sleeping Porch
X Baths 63, 64, 67, 68.
Y Rooms 63 to 68
Z Sleeping Porches 63 to 68
AA Women's Airing Balcony E & G
Bb Internes Room & Toilet
CC Linen Room
EAST WING
WEST WING
SECOND FLOOR PLAN
Scale

FIG. 335. CENTRAL NEW ENGLAND SANATORIUM, RUTLAND, MASS.
Edward F. Stevens, Architect

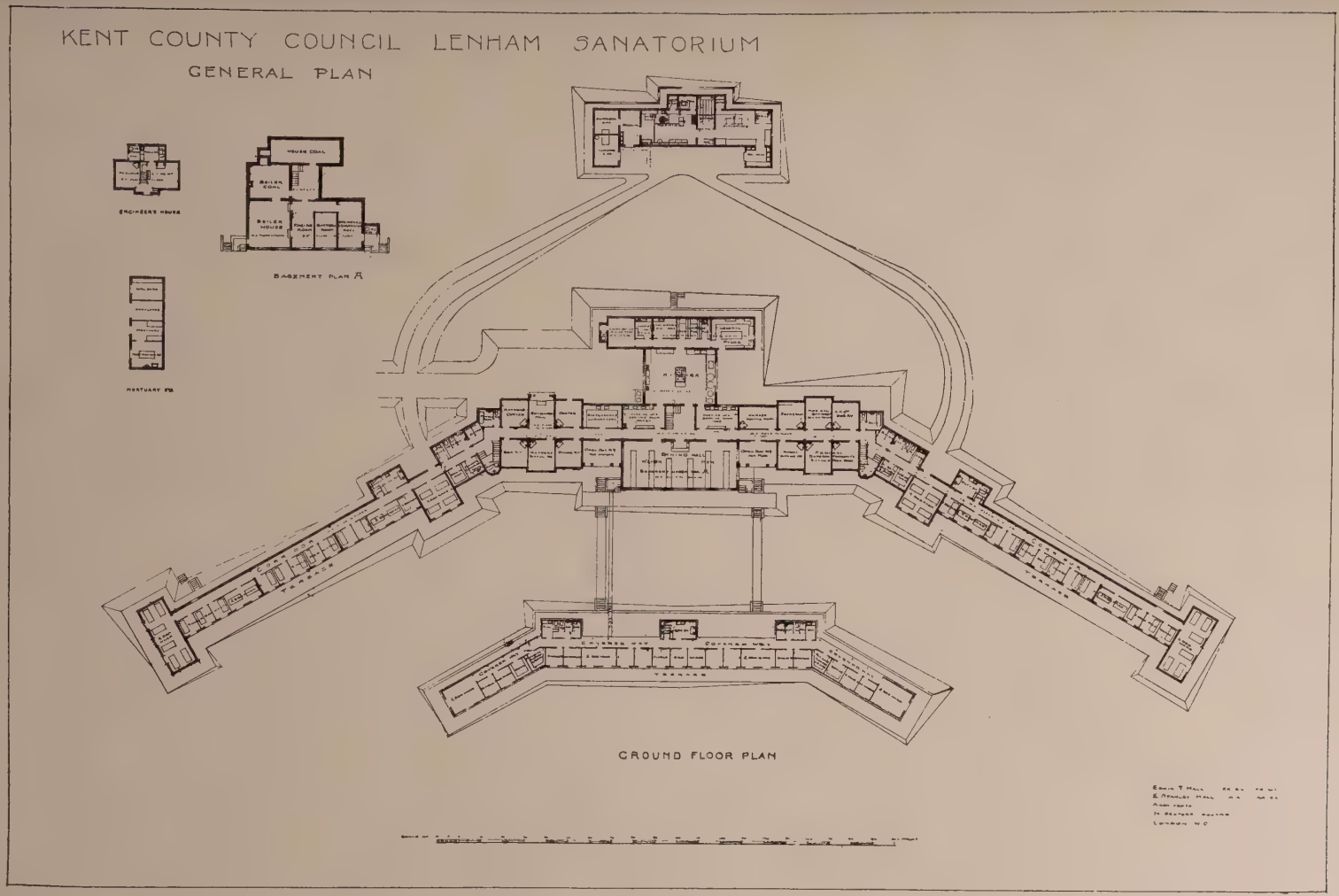



FIG. 335A. KENT COUNTY COUNCIL SANATORIUM, ENGLAND
Edwin T. Hall, F. R. I. B. A.; E. Stanley Hall, F. R. I. B. A., Architects

the institution can be done largely by the patients, with a tailor shop for the mending of patients' clothing, a harness shop for all leather work, carpenter shop for the necessary repairing, sewing rooms for repairing the linen and the making up of new material. Light employment during certain hours can be made a profit to the institution and a help to the patient. Waiting on tables and the light janitor work about the building can all be done by the patients. Dr. Marcus Patterson, of Frimley, England, has had remarkable results with carefully controlled occupational therapy, using such work as flower and vegetable gardening, chicken raising, etc., and extending to the care of lawn and grounds, painting, grading, etc.*

The "Altro" workshops, New York, employ only arrested tubercular cases. They maintain sanitarium conditions, yet run a profitable business in the manufacture of clothing.

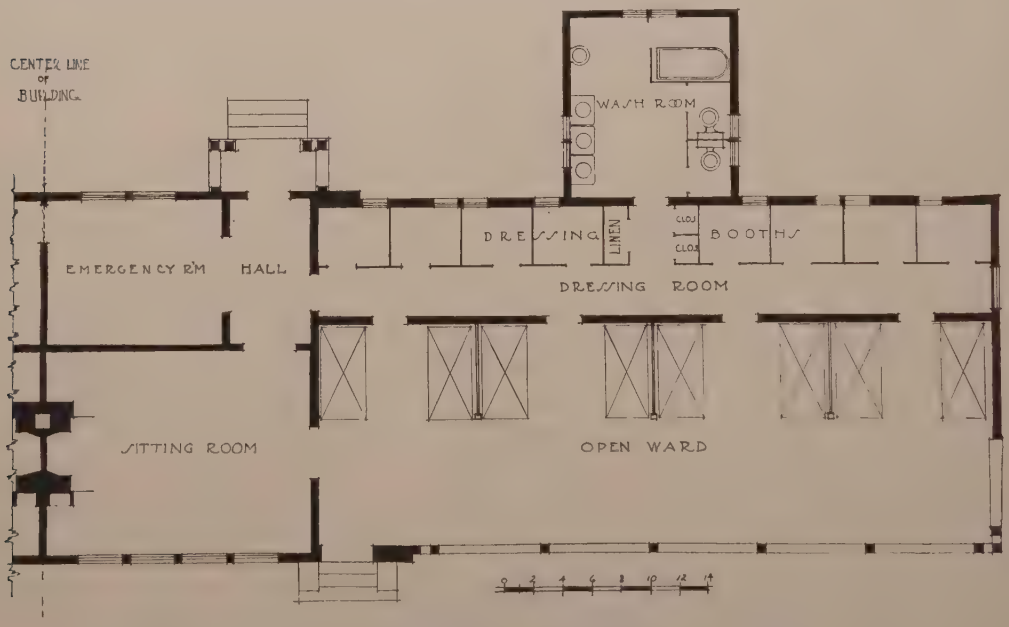



FIG. 336. PAVILION—NOVA SCOTIA SANATORIUM, KENTVILLE, N. S.
Scopes & Feustmann, Architects

KENT COUNTY COUNCIL SANATORIUM, England (Fig. 335A), presents an interesting solution of the housing of patients, providing the maximum of light and air, with well-lighted corridors, duty rooms and offices on the shady side, leaving the entire south portion to the patients.

There is an intimate relationship through the connecting corridor

*"Auto-inoculation in Pulmonary Tuberculosis," Marcus Patterson, M. D.

to the administration block, in which is located the various offices, day rooms, dining-rooms and kitchens. A broad terrace surrounds the whole group of buildings, making outdoor recreation possible.

For the ambulatory class, dining-rooms must be provided, general assembly rooms for religious and secular services, recreation rooms, reading rooms, store and post-office, as well as general examining rooms, dental rooms, barber shops, etc.

An operating department should be provided, for the presence of tubercular germs does not prevent appendicitis or other troubles. If care in an acute hospital is easily available, the operating room will probably not be used, and may be omitted. There should be, however, a room equipped for doing surgical dressings.

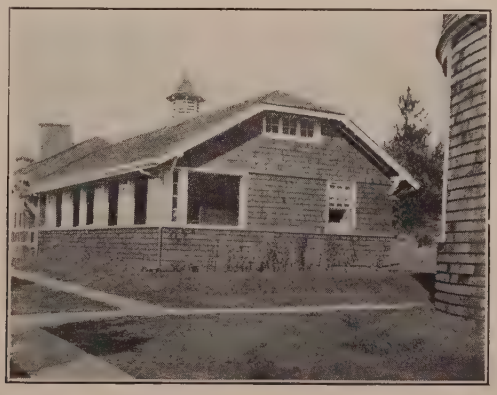


FIG. 337. PAVILION—NOVA SCOTIA SANATORIUM, KENTVILLE, N. S.
Scopes & Feustmann, Architects

One item peculiar to the care of tuberculosis is the provision for the destruction of sputum cups, gauze and dressings which have come in contact with the patient. This can be a separate building where the patient can deliver his sputum cup and receive a fresh one, and where there is a suitable incinerator for the absolute destruction of all waste material.

Open air day shacks or shelters can be provided through the grounds at little extra expense. There are numerous patterns and they may even be made revolving, like the one photographed by the writer in Amsterdam, Holland (Fig. 319), where the pavilion could be turned to shield the patient from sun or wind.

Of the many good examples of tuberculosis hospitals and sanatoria, few will be here shown, as this subject has been so carefully taken up by Dr. Thomas S. Carrington in his work on

"Tuberculosis Hospital and Sanatorium Construction,"* to whom the writer is indebted for so many helpful suggestions in his own practice.

A simple solution of the tuberculosis ward for the general hospital which was designed for a City Health Board is here shown (Figs. 322, 323). This unit provides for a limited number of both chronic and incipient cases, the administration, food, and laundry being taken care of in another building. This unit is a part of the contagious department under the charge of the city.

The City of New York, through its Department of Health, has established at Otisville, at an altitude of from eleven hundred to twelve

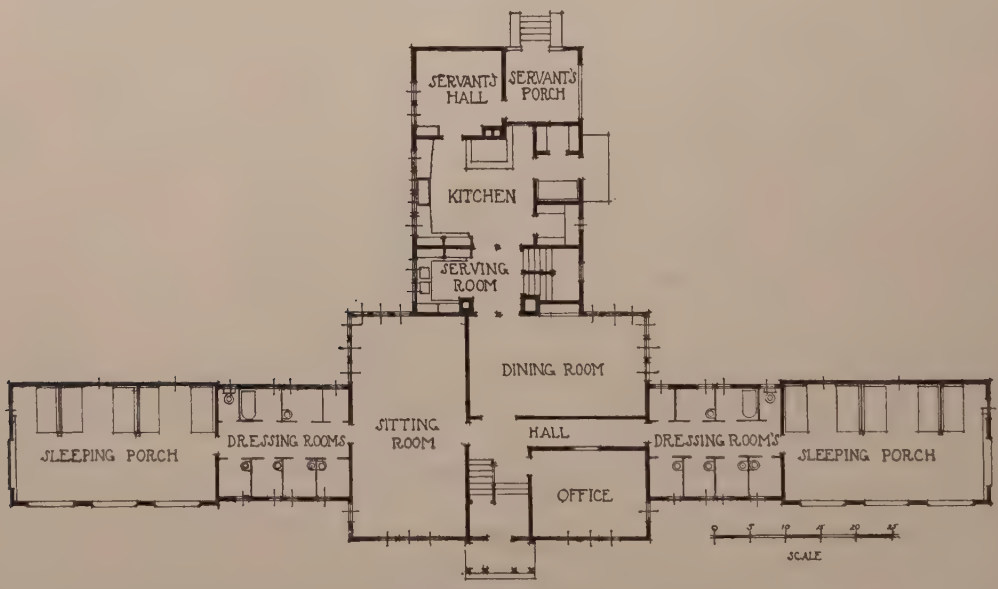



FIG. 338. PAVILION—LOOMIS SANATORIUM, LOOMIS, N. Y.
Scopes & Feustmann, Architects

hundred feet in the Shawangunk Mountains, a most complete sanatorium for the care of tuberculosis.

Various types of construction and units were built from a single bed tent house to the more pretentious fireproof building; but in practically every building the sleeping is out-of-doors. Dressing-rooms and day-room are provided, which are heated certain hours in the day.

The Department of Charities also provides in its hospital work for the care of tuberculosis, both in the general hospitals on Blackwells Island and in the Sea View Hospital on Staten Island. In the latter institution (Fig. 324) which provides for two thousand pa-

*Published by National Association for the Study and Prevention of Tuberculosis, 105 E. 22nd St., New York.

FIG. 339. THE OLIVIA COTTAGE—LOOMIS SANATORIUM, LOOMIS, N. Y.
Scopes & Feustmann, Architects

tients, the earlier group is used to house the chronic or bed patients. The ambulatory patients will occupy the twenty-one new pavilions. The institution is well balanced, accommodating an equal number of bed and ambulatory cases. The new out-door pavilions are built in two groups, the one at the southwest to accommodate six hundred men, with "group" or executive building, and the other at the northeast to accommodate four hundred women. Dining facilities for the men are afforded by the new dining hall placed on the main axis of the original group, and served by the main kitchen. This building (Fig. 325) also is used for an entertainment and assembly hall for patients of both sexes. The women are served in the old dining building.

While the administration of the entire group is from the main administration building, the "group" building in the center of the male section contains the offices of the medical examiner and matron. There are examining rooms, pharmacy and treatment rooms.

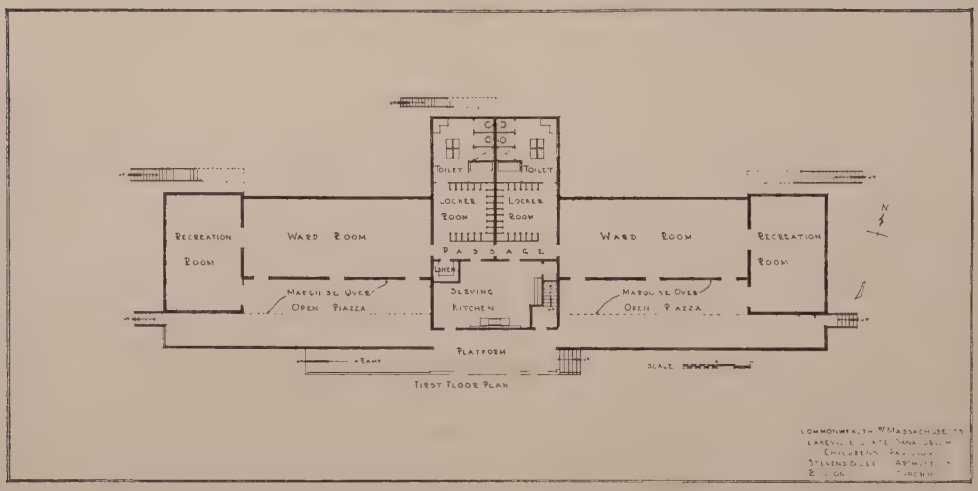



FIG. 340. LAKEVILLE STATE SANATORIUM, MIDDLEBORO, MASS.

baths for men, store, barber shop, dental treatment room, recreation rooms and library, as well as work rooms for various industries, and a linen room where all linen for the group is given out.

The pavilion buildings, twenty-one in number, are practically identical (Figs. 329 and 330). They are two stories in height, of fireproof material, divided into four sleeping apartments of twelve beds each, with each unit of two beds separated from the others by a dividing screen six feet high, but open on end and underneath to permit air circulation. These are not heated and are open to the south, with possible closing by the use of cloth screens on frames hinged at the top.

For each two wards a day room is provided, connecting directly with the toilet section, beyond which is the locker room. Each patient is provided with a locker three by four feet, with short door and screen ceiling, allowing free circulation of air but preventing interference from outside.

Two of the units used at the Boston Consumptives' Hospital at Mattapan will serve to illustrate the various units for different treatment of chronic and incipient cases. The ward building (Fig. 331) here shown is two stories in height. Each unit is divided in the center, and the main service rooms are placed between the two fourteen-bed wards. Ample airing balcony space is provided, and the unit has proved easy of administration. For the more active patients the one-story pavilions (Fig. 332) are used. This unit is similar to those used in other state and city hospitals, and has been fully described and

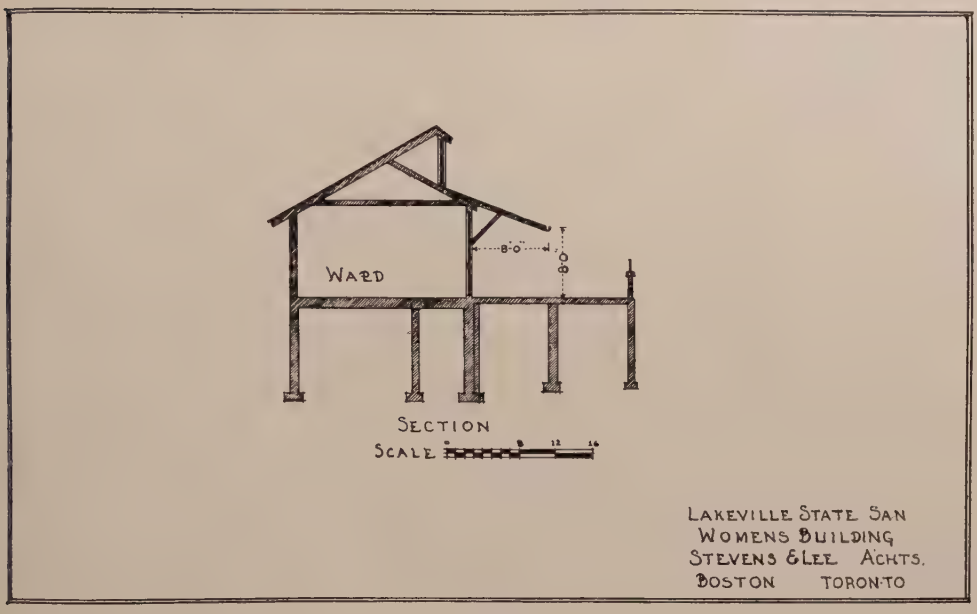



FIG. 341

classified by Dr. Carrington.* Larger locker space is provided for the patients, additional airing balcony for each bed, an emergency room, and a room for the nurse, as well as a large day room accessible to each division. The building is of wood, in simple, picturesque style.

*Published by National Association for the Study and Prevention of Tuberculosis, 105 East 22nd Street, New York.

FIG. 341A. LAKEVILLE STATE SANATORIUM, MIDDLEBORO, MASS.

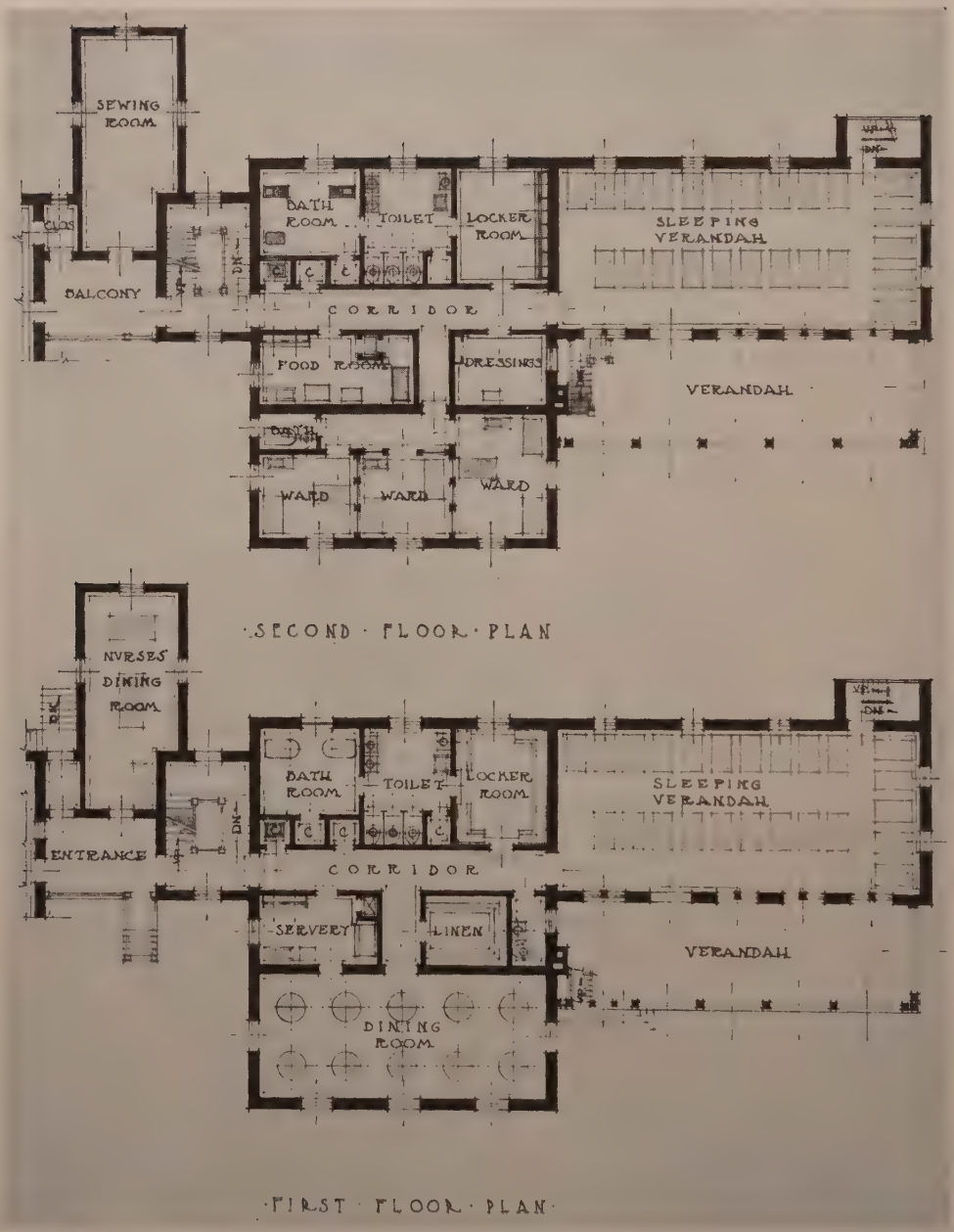



FIG. 341B. I. O. D. E. PREVENTORIUM, TORONTO, ONTARIO
Stevens & Lee, Architects

There are throughout the country private sanitoria for the care of tuberculous patients who can afford to pay for a greater degree of comfort. The CENTRAL NEW ENGLAND SANITORIUM, Rutland, Massachusetts, will serve to illustrate this type of institution.

Designed to be built upon a beautiful southern slope, this group of buildings would, when complete, house about eighty patients. The main building, facing south, consists of three sections, separated by fireproof balconies. The center section contains: on the ground floor (Fig. 333), the kitchen, laundry and heating plant; on the first floor (Fig. 334), the offices, examining and treatment rooms, the lounge, and the patients' dining room; on the second floor (Fig. 335), the superintendent's suite and guest rooms at the front, rooms for patients' friends, etc., at the rear. The main lounge and the dining-room extend through two stories, and are beautified with large fireplaces.

The three floors of the east and west wings, which house the patients, are planned to provide for varying degrees of luxury. There are single rooms, two-bed wards and private suites, all with ample outdoor balconies. The utility rooms are on the north side. The connecting airing balconies provide additional outdoor space, and make a fireproof cut-off between the three sections. The exterior is in Mission style. The construction is of hollow tile, with rough plaster finish.

At the NOVA SCOTIA SANITORIUM, Kentville, Nova Scotia (Figs. 336, 337), there are two types of buildings. The one for ambulatory patients is self-contained, having open verandas which may be closed in storms or severe weather, dressing rooms, a sitting room with wide windows, and an emergency room.

The OLIVIA COTTAGE, at the Loomis Sanitorium, Loomis, New York (Fig. 339), provides an enclosed portion for sick patients, utilities, or for severe weather. For ambulatory cases in good weather the porches are wide-open and airy.

In the reconditioning of the LAKEVILLE STATE SANATORIUM, Middleboro, Massachusetts (Figs. 340, 341, 341A), the state has with reasonable expense made over three or four of their buildings, for the treatment of non-pulmonary tuberculosis by heliotherapy, by merely extending the porches, building windbreaks, providing permanent roofs over one-half the porch width, and increasing the utilities. They have also provided facilities for the use of various therapeutic lamps and added baths and recreation rooms.

The efforts toward prevention of disease are seen in all parts of the world. School children are being annually "checked up" and care-

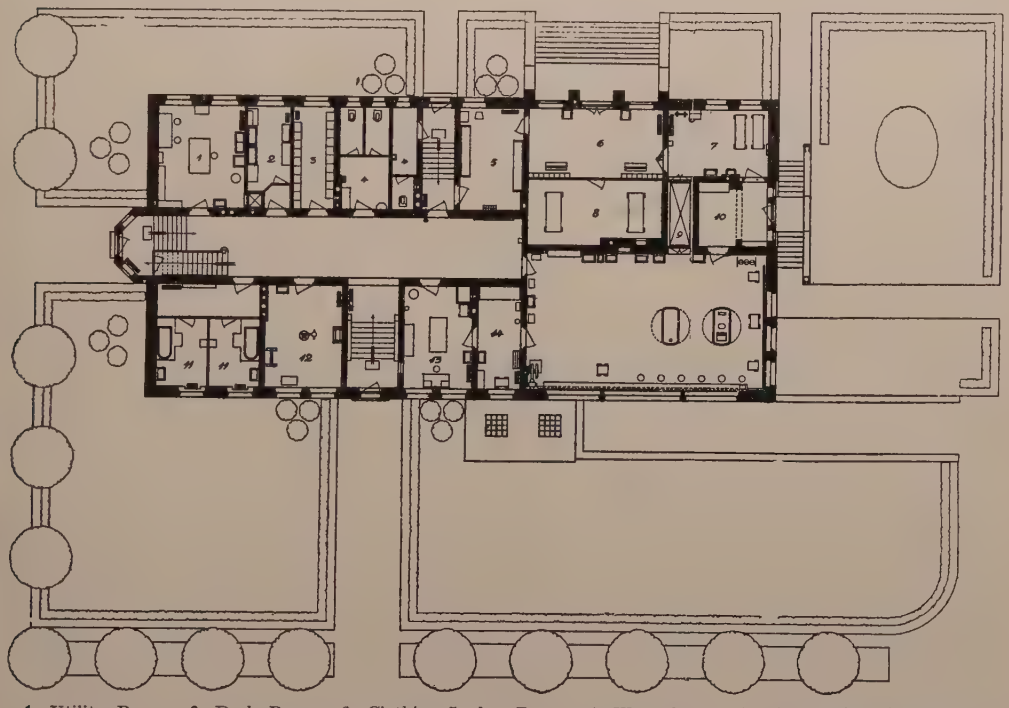
ful records kept so that upon showing the slightest tendency toward tubercular trouble the child can be isolated and given proper treatment. For this purpose preventoria are springing up all over the country. A simple example of this type of medical institution is the I. O. D. E. PREVENTORIUM at Toronto, Canada (Fig. 341B). The plan shows a recent addition to that institution, where the outdoor sleeping rooms and outdoor play rooms are emphasized. In another portion of the institution there is an outdoor gymnasium, as well as an isolation building for the care of other infections.

## CHAPTER XII

# THE DEPARTMENT OF RESEARCH

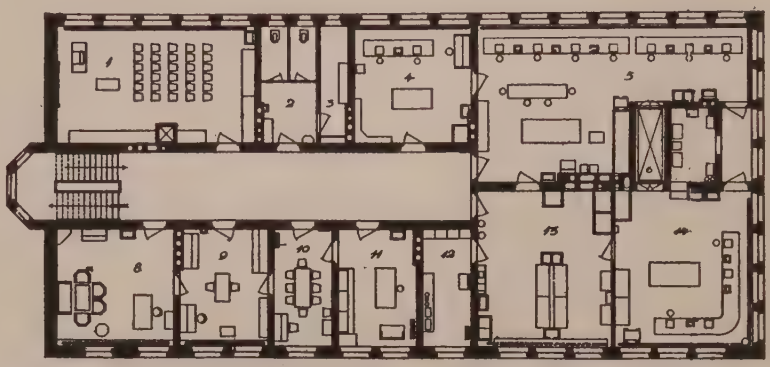
### THE PATHOLOGICAL DEPARTMENT

THE development of the laboratory work in the general hospital depends largely on the personnel of the staff, the proximity to established independent laboratories, and the possibility of the development within the institution. In the larger hospitals, separate buildings away from the main group are devoted entirely to laboratory purposes, where there are classrooms for teaching, autopsy rooms and morgue; and often the chapel is connected with this building. These, with the local laboratories in the ward units and the operating units, form a chain for diagnostic and research work, which is every year becoming more and more essential. Facilities and equipment which ten years ago were considered elaborate are now thought bare necessities.



1. Utility Room. 2. Dark Room. 3. Clothing Locker Room. 4. Waterclosets. 5. Mourners' Waiting Room. 6. Ante Room. 7. Undertakers Room. 8. Body Display or Identification Room. 9. Freight Lift. 10. Hall. 11. Bath Rooms. 12. Roentgen Ray Rooms. 13. Assistant's Room. 14. Entry. 15. Dissecting Room.

FIG. 342. FIRST FLOOR, PATHOLOGICAL BUILDING, MUNICH-SCHWABING HOSPITAL, MUNICH, GERMANY



1. Museum and Lecture Room. 2. Watercloset. 3. Store Room. 4. Laboratory of the Prosecutor. 5. Histological Laboratory. 6. Lift. 7. Incubator Room. 8. Prosecutor's Room. 9. Library. 10. Reading Room. 11. Supply and Instrument Room. 12. Scale or Balance Room. 13. Chemical Laboratory. 14. Bacteriological Laboratory.

FIG. 343. SECOND FLOOR, PATHOLOGICAL BUILDING, MUNICH-SCHWABING HOSPITAL MUNICH, GERMANY

FIG. 344. DISSECTING ROOM, PATHOLOGICAL BUILDING, MUNICH-SCHWABING HOSPITAL MUNICH, GERMANY

In the small hospital, however, of fifty beds or less, where the laboratory work is done by members of the staff, it is not customary to provide generously; but Dr. Kahn of the Beth Israel Hospital, New York, says: "The patients in a small hospital are just as sick as those in large hospitals and their ailments are just as obscure and baffling. Good facilities for studying disease are essential, no matter where the patients happen to be housed."

Often light basement rooms will serve for the purpose, the principal necessity being light. There must be space and equipment for making blood tests, urinalyses, examinations of pus, sputum and other bacteriological work; and every hospital will have its own particular addition to the list. In planning laboratories at the present time, it should be kept in mind that enlargement is almost sure to be needed.

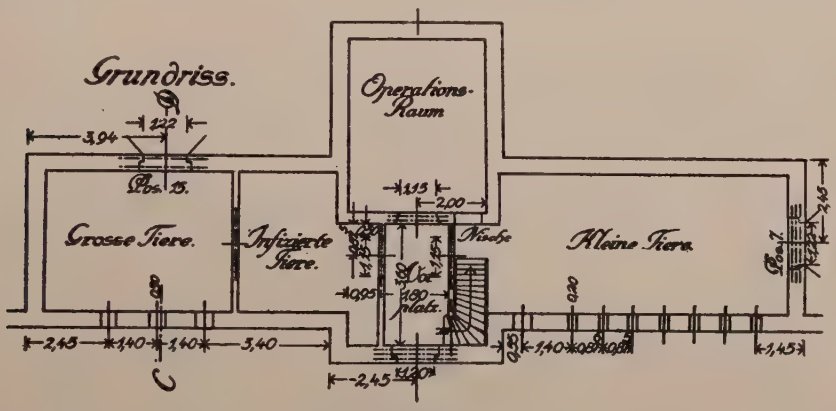



FIG. 345. ANIMAL BUILDING, PATHOLOGICAL DEPARTMENT, MUNICH-SCHWABING HOSPITAL MUNICH, GERMANY
Richard Schachner, Architect

Some pathologists prefer large rooms with several technicians in each; others believe that small subdivisions are better.

For the larger research laboratories, space for the hygienic care of animals used in experimentation must be provided, either on the roof of the building or even in a separate building; but if they must be kept on lower levels, the rooms should receive special ventilation.

Every hospital, even of fifty beds or less, should have a room where autopsies can be performed, and suitable equipment for the same should be furnished. This room must be well ventilated, should have a flushing floor drain, simple autopsy table, with sink and facilities for properly handling the body. Good day lighting is desirable but not necessary; but there must be an abundance of artificial light.

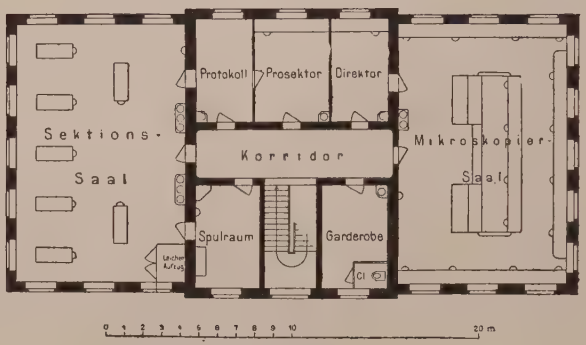



FIG. 346. Second Floor

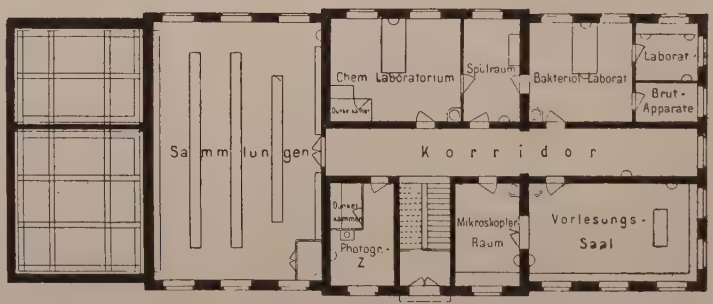



FIG. 346A. First Floor

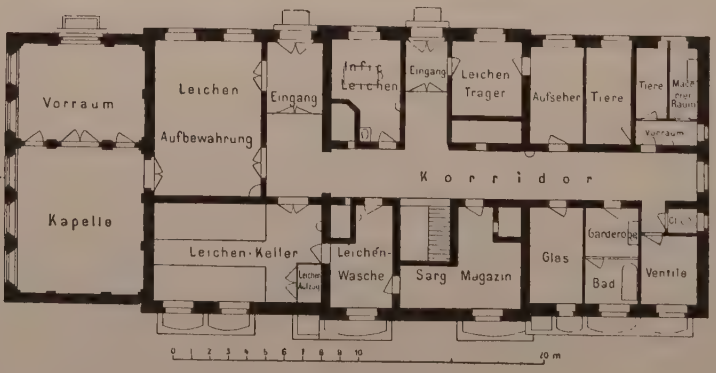



FIG. 346B. Basement

PATHOLOGICAL BUILDING, ST. GEORG HOSPITAL, HAMBURG, GERMANY

In the larger hospitals in Europe, the pathological department is under separate management. The plans of the Pathological Institute of the Munich-Schwabing Hospital are here shown (Figs. 342, 343) and are self-explanatory. The detail and equipment are excellent, the dissecting room in particular (Fig. 344) showing most careful attention to plumbing and outfit. In this institution there is a separate building (Fig. 345) for animals, with special operating room perfectly equipped.

The pathological building at St. Georg is another carefully developed department, as the few illustrations will show (Figs. 346, 347).

The Mayo Clinic building, Rochester, Minnesota (Figs. 348-351), built by the Drs. Mayo for their own private work, is in effect an out-patient building, but contains extensive and well-planned laboratories. The whole of the third floor and part of the ground floor are given up to research.

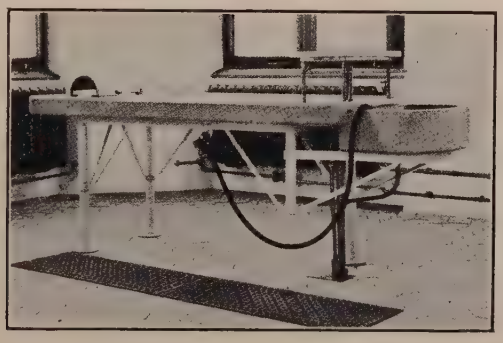


FIG. 347. DISSECTION TABLE, ST. GEORG HOSPITAL, HAMBURG, GERMANY

Beth Israel Hospital, New York City, has an entire floor of a large building devoted to laboratories (Fig. 352), provision being made for all departments of pathology, including basal metabolism, radium treatments, and for animal research.

Mt. Sinai Hospital, New York (Fig. 353), has an excellent pathological building, four stories in height. It has animal and autopsy rooms in the basement, museum and library on the first floor, and many small laboratories on the second and third floors.

Grace Hospital, Detroit, Michigan (Figs. 354-356), has a good-sized department, located above the operating floor. It provides working facilities for seven technicians, and accommodations for the private work of the visiting staff; it is designed also to give space for post-graduate work. It is an economical unit for so many activities.

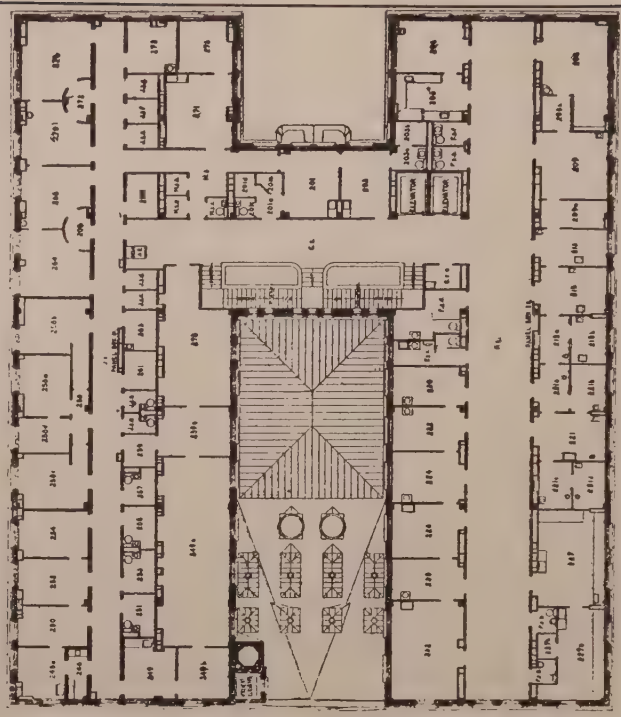


FIG. 349. Second Floor

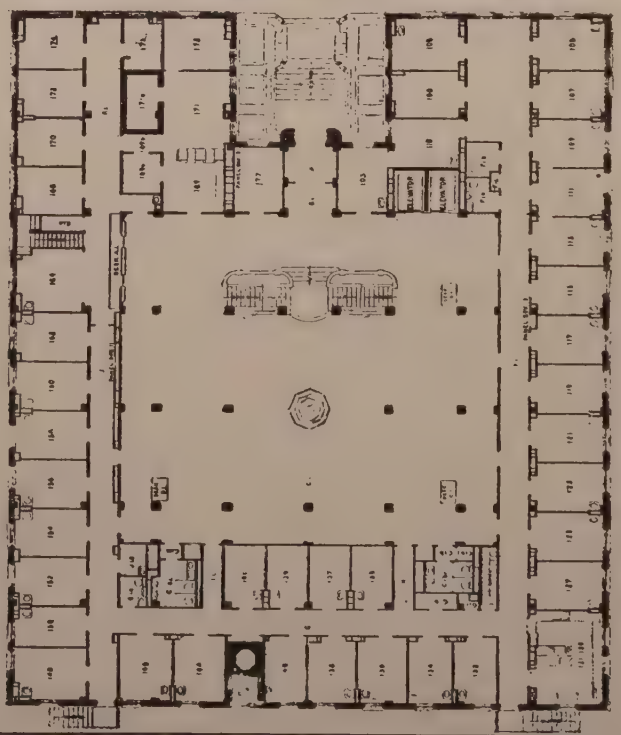


FIG. 348. First Floor

MAYO CLINIC, ROCHESTER, MINN.
Ellerbe & Round, Architects

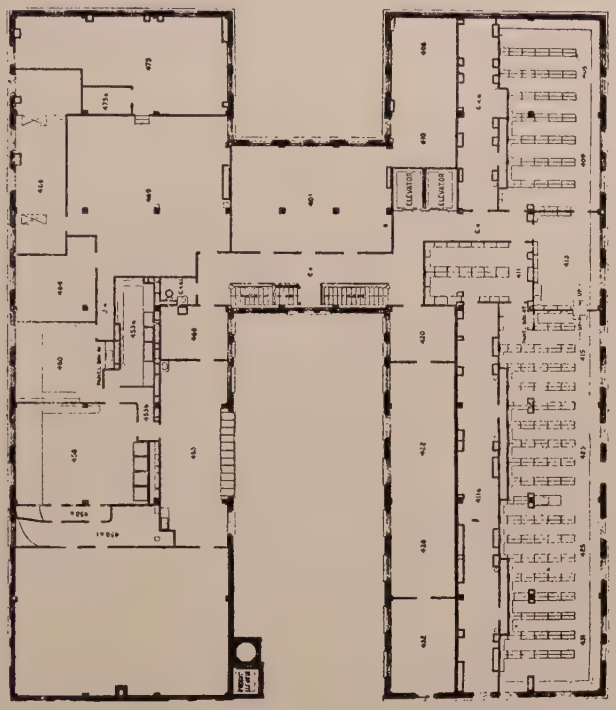


FIG. 351. Attic

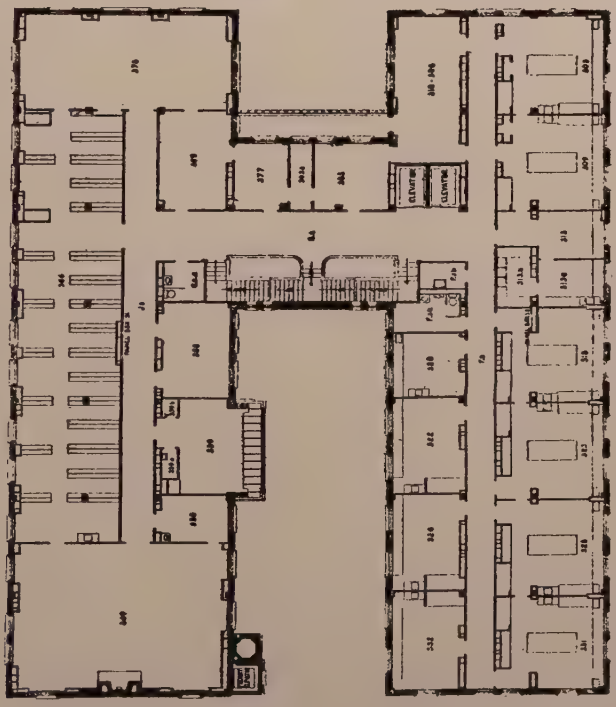
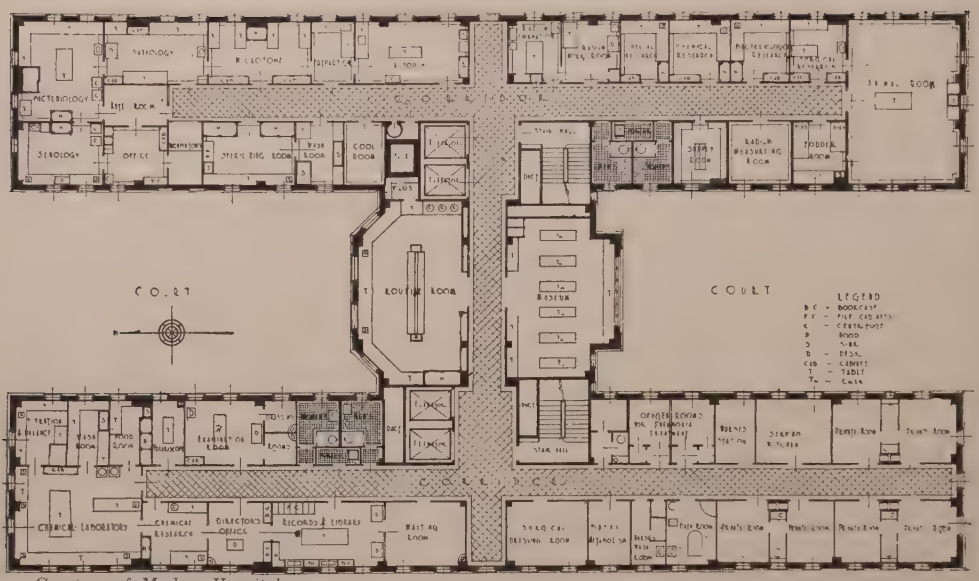


FIG. 350. Third Floor

MAYO CLINIC, ROCHESTER, MINN.
Ellerbe & Round, Architects




Courtesy of *Modern Hospital*

FIG. 352. PATHOLOGICAL DEPARTMENT, BETH ISRAEL HOSPITAL, NEW YORK, N. Y.

In the Ottawa Civic Hospital, Ottawa, Canada (Fig. 85), there are four good-sized laboratories on the ground floor with a commodious autopsy room next them. An elevator goes directly from the autopsy room to the basement, where very complete rooms for the care of bodies, the use of the undertaker, and a mortuary chapel are provided.

The Thorndike Memorial Laboratory of the Boston City Hospital is one of the best examples we have of a building devoted to research (Figs. 357-361). The two lower floors are occupied by the X-ray department, the third and fourth by laboratories. The second floor houses patients who require special study.

The laboratory floors are divided into both large and small units. The special laboratories are used for blood and stomach work, photomicrography, studies in metabolism, cardiographic work, etc. The building is equipped with gas, compressed air, vacuum, direct and alternating current, high voltage, high pressure steam, and electrically operated refrigerators. There is a small animal house on the roof.

Attention is called to the laboratories of the Ohio Valley General Hospital, Wheeling, West Virginia (Fig. 107), and to those in the out-patient department of the Royal Victoria Hospital, Montreal (Fig. 388).

Courtesy of *Architectural Forum*

FIG. 353. PATHOLOGICAL BUILDING, MT. SINAI HOSPITAL, NEW YORK, N. Y.

The Royal Victoria Hospital, Montreal, felt the need of more accuracy in handling nephritis and other metabolic diseases. They therefore set aside a small wing which they call their "Metabolism Clinic," providing for in and out patients, laboratory and kitchen. The laboratory makes analyses of blood, urine, gases, and food (Fig. 362).

*Filing Space.* In all laboratories, adequate provision should be made for the filing of records, plates and specimens, and for stenographic or clerical work.

### THE ROENTGEN-RAY DEPARTMENT

The Roentgen-ray, in its divers uses, plays a most important part in the work of every hospital. It has become invaluable in diagnosis. The larger hospitals employ a man for this work alone, and while it is true that the best results can be had only by an expert, no hospital can get along without some provision for X-ray examinations. There must be facilities for dealing with fractures and for making

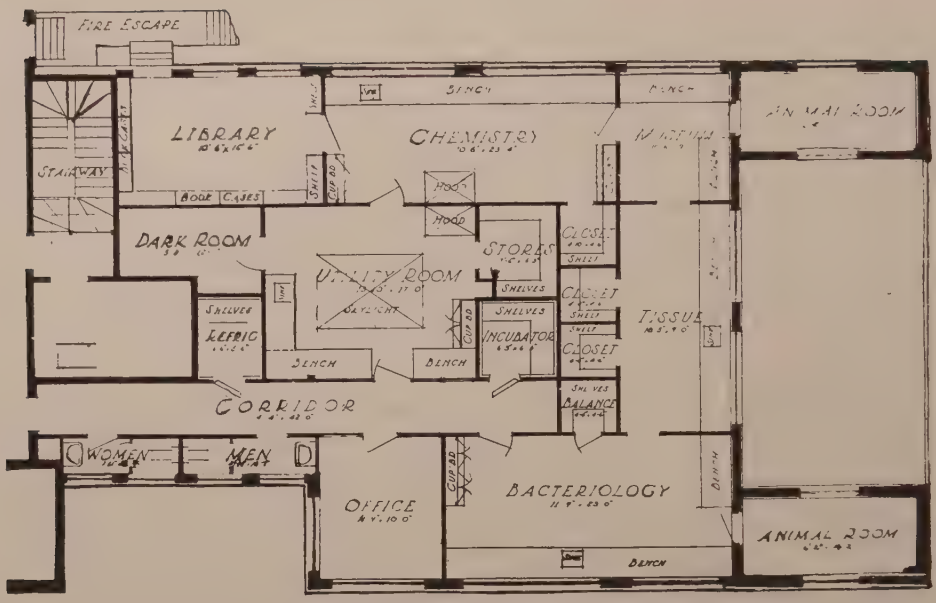



FIG. 354. LABORATORIES, GRACE HOSPITAL, DETROIT, MICH.

stomach and intestinal diagnoses. Where a Roentgenologist is employed, examinations of many of the soft tissues will be required and more extensive provision must be made. As with laboratory work, a department which ten years ago was counted luxurious, is now barely sufficient for ordinary work.

A few principles may be mentioned in providing for this department:

In selecting Roentgen laboratory avoid cellar, particularly if it is damp; moisture causes trouble with the transformer and high tension wiring.

The room should be sufficiently high studded to allow overhead high tension system.

The X-ray transformer requires a special electric current supply. Do not rely on the word of a local electrician or power company.

Special precaution should be taken that all electric light conduits in Roentgen room are properly grounded.

Arrangements should be made for a perfect ground near position of X-ray transformer.

The room to be used for fluoroscopy should be so arranged that it can readily be made light proof.

Special lead protection is necessary where the Coolidge tube is used for X-ray therapy.

FIG. 355. PHYSIOLOGICAL CHEMISTRY LABORATORY, GRACE HOSPITAL, DETROIT, MICH.

FIG. 356. TISSUE PATHOLOGY LABORATORY, GRACE HOSPITAL, DETROIT, MICH.
Courtesy, *Modern Hospital*

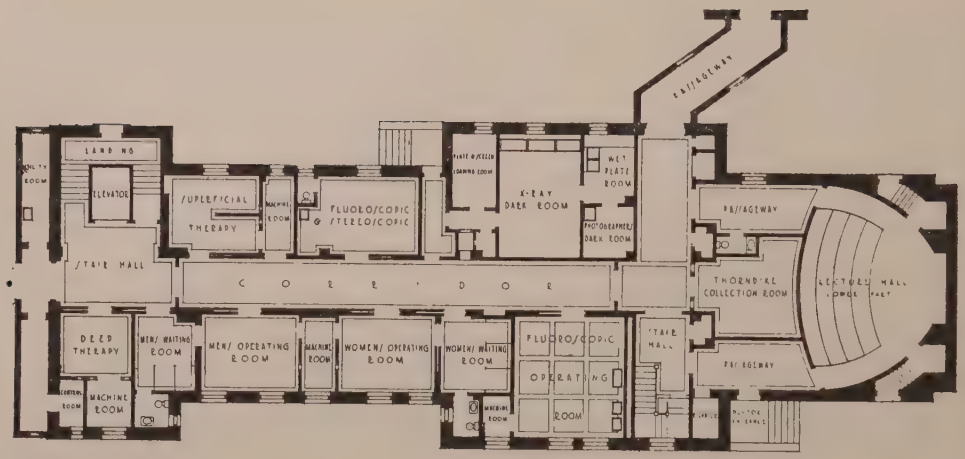



FIG. 357. Basement Floor Plan

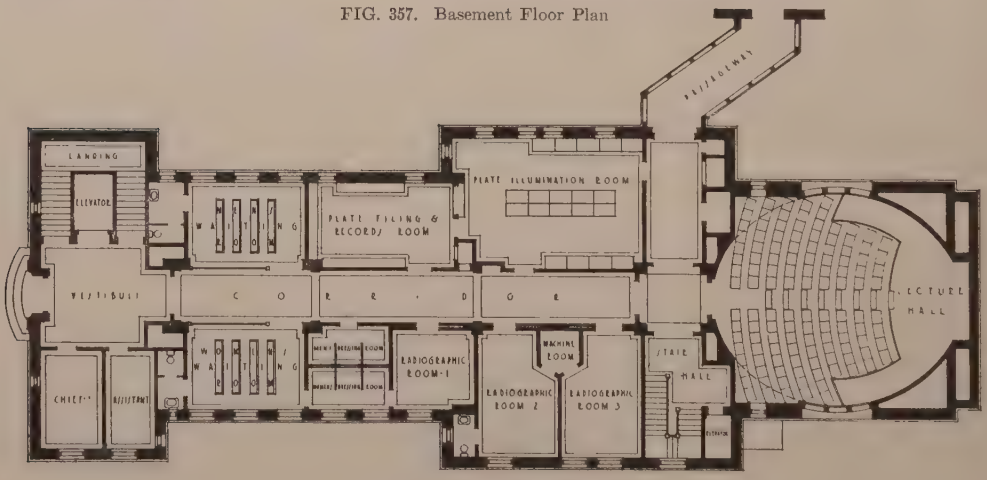
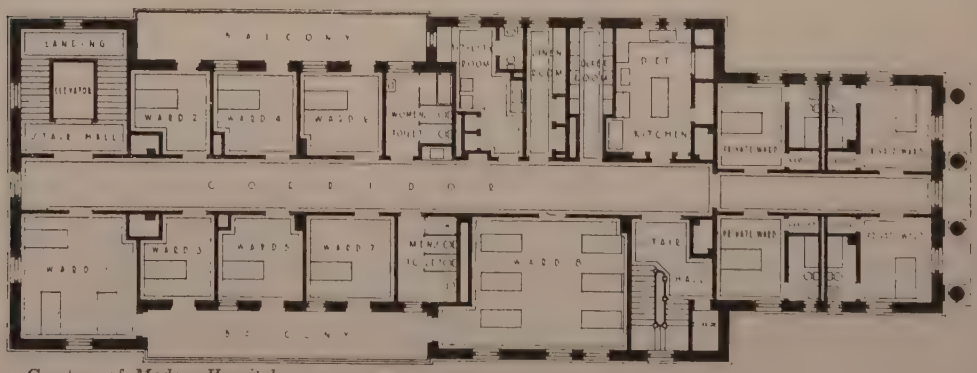


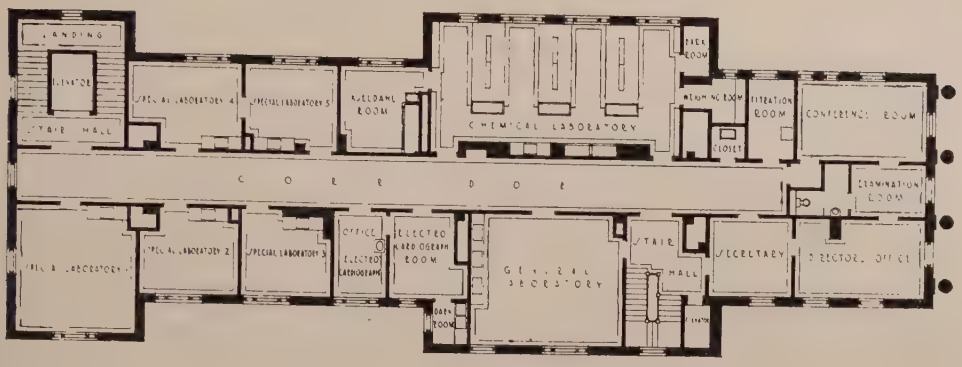

FIG. 358. First Floor Plan




Courtesy of *Modern Hospital*

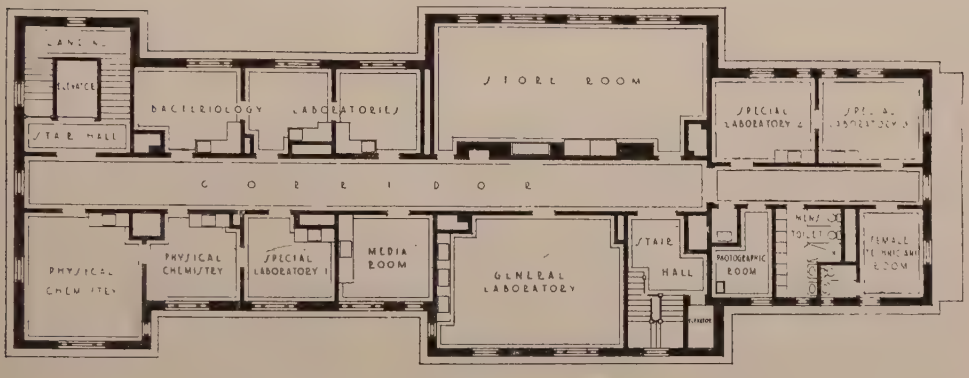
FIG. 359. Second Floor Plan

THORNDIKE MEMORIAL LABORATORY, BOSTON CITY HOSPITAL, BOSTON, MASS.
Maginnis & Walsh, Architects




THIRD FLOOR PLAN

FIG. 360




FOURTH FLOOR PLAN

Courtesy of *Modern Hospital* FIG. 361

THORNDIKE MEMORIAL LABORATORY, BOSTON CITY HOSPITAL, BOSTON, MASS.
Maginnis & Walsh, Architects

The dark room, for developing and loading plates, should be located as near the Roentgen laboratory as possible.

Hot water, as well as cold running water, in the dark room is desirable.

There should be a special sink for developing, arranged with an ice compartment for summer, if necessary.

We know that the recurrent use of this powerful medium has caused serious burns and the destruction of live tissue, so that the operators should have every possible protection. Lead screens afford this protection against both direct and reflected rays. It is more common now to provide control rooms heavily lined with lead at least one-eighth inch thick; and where vision is required, lead glass is used for the operator.

If portable equipment is to be provided for use in other parts of the hospital, there should be space to store it in the X-ray department, and electric outlets provided for it in the wards.

This department should be planned for at the beginning, not left to chance.

Probably there is no more elaborate example of the use of the X-ray in diagnosis than at the Mayo Clinic, Rochester, Minnesota (Fig. 349). Half of the second floor of the building is devoted to this purpose.

The Buffalo General Hospital, Buffalo, New York, has a separate building for its Roentgen-ray department (Fig. 363). The control room is in the center, and around it are situated the two operating rooms, a treatment room, fluoroscopic and waiting rooms. At the left are the dark and loading rooms, developing department, etc. On the right are the filing and viewing rooms.

Courtesy, *The Modern Hospital*

FIG. 362. LABORATORY, METABOLISM CLINIC, ROYAL VICTORIA HOSPITAL, MONTREAL, CANADA

In the Notre Dame Hospital, Montreal, the X-ray department is not large, but is quite complete (Fig. 95). The control room is between the two operating rooms; there is a good dark room, a viewing room, space for storage, etc.

In the Thorndike Memorial building of the Boston City Hospital there is probably one of the best Roentgen departments in the country (Figs. 357 and 358). In it no machine furnishes power to more than one room, and each room is wired separately to the main switchboard, so trouble with one machine will not affect any other.

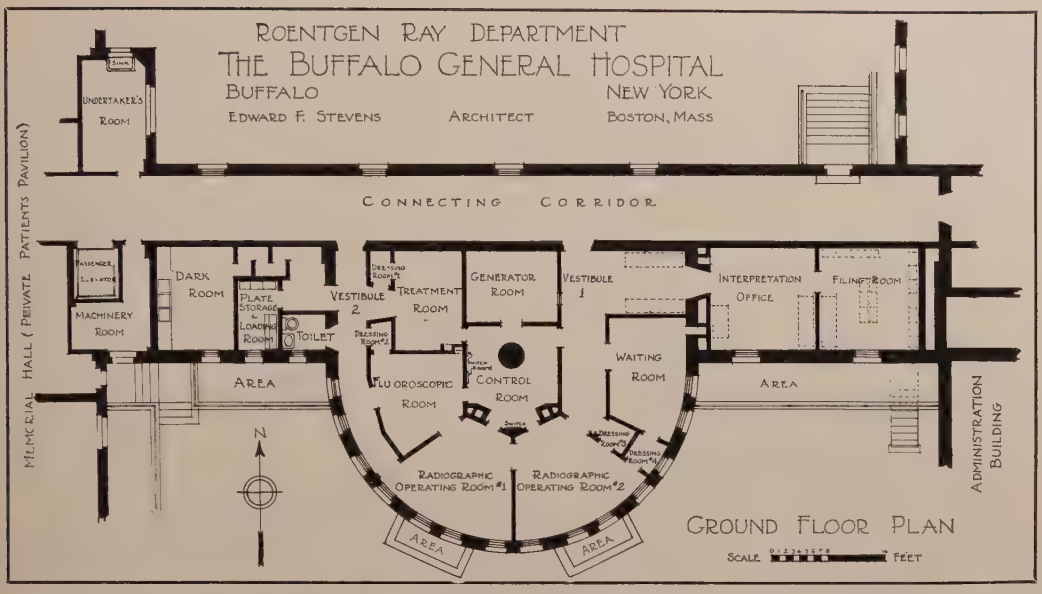



FIG. 363. ROENTGEN-RAY DEPARTMENT, BUFFALO GENERAL HOSPITAL, BUFFALO, N. Y.
Edward F. Stevens, Architect

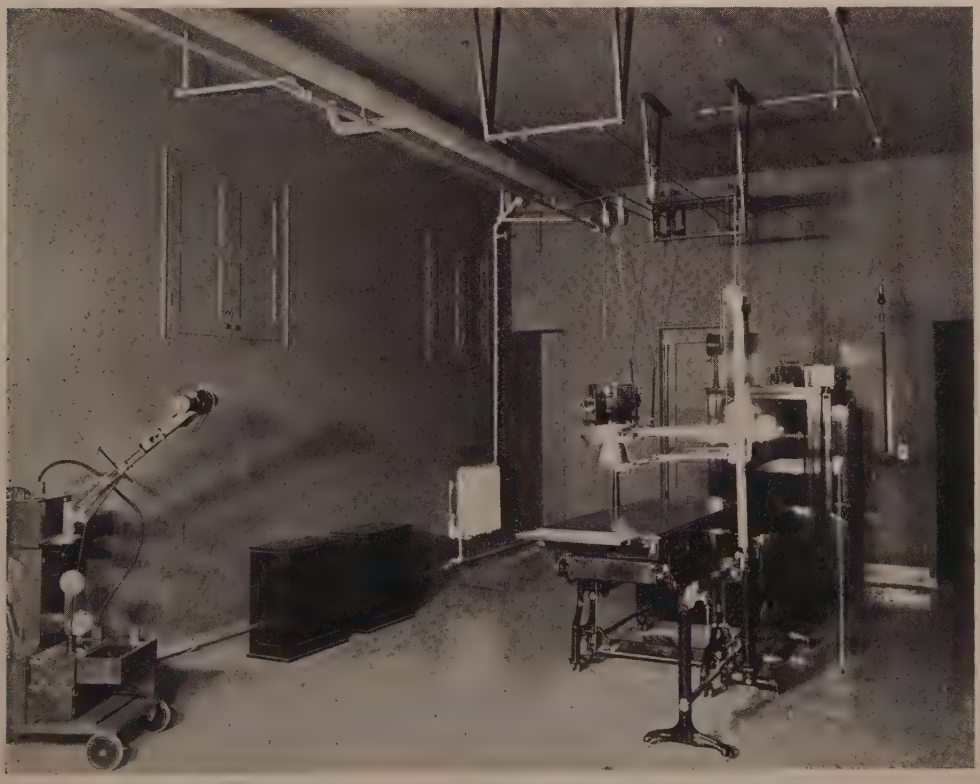


FIG. 364. RADIOGRAPHY ROOM, EVERETT GENERAL HOSPITAL, EVERETT, WASH.

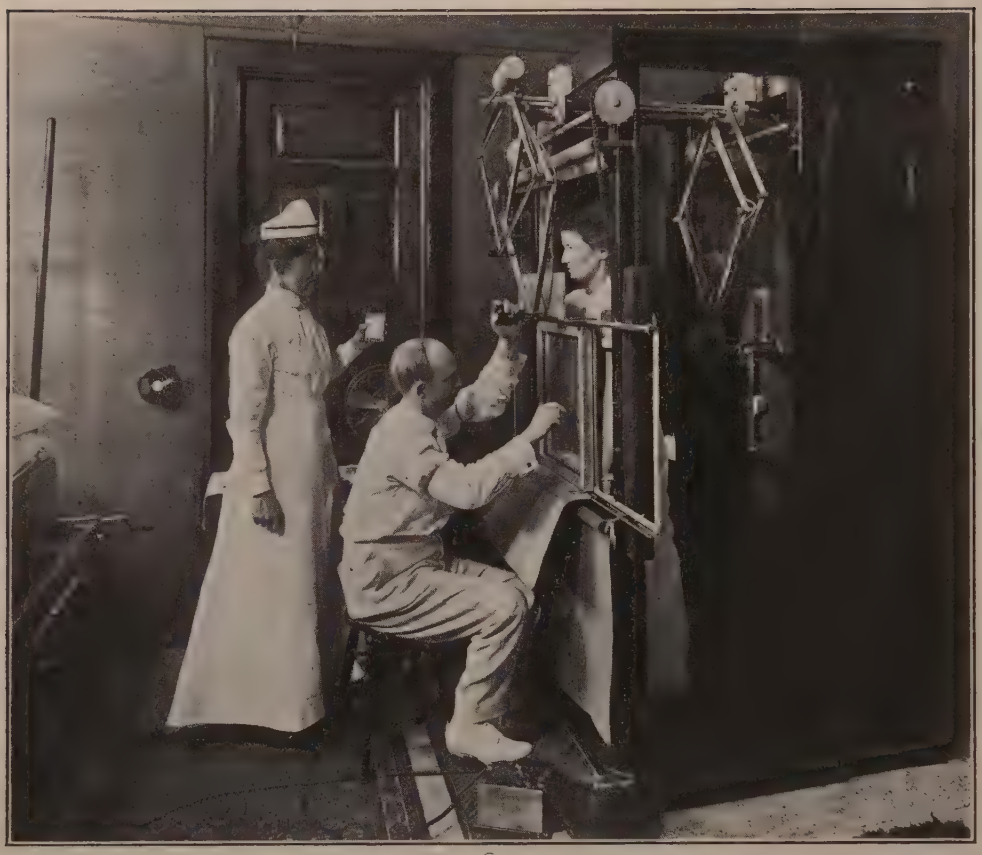


FIG. 365. UPRIGHT FLUOROSCOPE

Courtesy of *Architectural Forum*

FIG. 366. X-RAY DEPARTMENT, FIFTH AVENUE HOSPITAL, NEW YORK, N. Y.
York & Sawyer, Architects; Wiley E. Woodbury, M. D., Consultant

Ample artificial ventilation is provided, and there is a light-proof maze above each window. All rooms are surrounded with a one-eighth-inch sheet lead lining to the height of seven feet; in the deep therapy room the ceiling and walls are of one-half-inch lead. The doors everywhere are sliding, not swinging. The basement contains radiography and fluoroscopic rooms, separate departments for men and women, and a large dark room; on the first floor are the offices, additional radiographic rooms, large illumination rooms, and plate storage.

In the Roentgen department of the Ottawa Civic Hospital the generator is placed in the basement, the radiographic and treatment rooms being on the floor above. There is a fluoroscopic room and dressing rooms near by (Fig. 85).

The X-ray department of the Fifth Avenue Hospital (Fig. 366), New York, is well adapted to an active service. The office and examining rooms are near the elevators and there are ample dressing rooms with toilets. The machine room is between the radiographic and treatment rooms, the fluoroscopic opposite. The viewing room is near the plate storage.

Since films are now being used instead of plates, special attention must be given to fireproof storage for them. Most city fire laws require that there must be a direct outlet from the film storage room to the outside of the building, and many require self-closing fire doors and a sprinkler system. In the Buffalo General Hospital a fireproof storage room has been built on the opposite side of the corridor from the X-ray department.

Attention may be called to the Roentgen-ray departments of the Royal Victoria Hospital, Montreal, in the out-patient department (Fig. 388). Small departments are shown in the Ohio Valley General Hospital, Wheeling, West Virginia (Fig. 109), the Youngstown (Ohio) Hospital (Fig. 161), and the Barre (Vt.) Hospital (Fig. 401).

# CHAPTER XIII

## THE OUT-PATIENT DEPARTMENT

TODAY nearly every large hospital in the country has an out-patient department where more or less dispensary work is afforded people who are not enrolled as patients of the hospital, or more home care is provided.

The location of the hospital in the community, the likelihood of casualties, and the nearness to other dispensaries have a bearing on the development of this department. Except, perhaps, in the large city communities, this dispensary or out-patient service can be rendered more effectively in connection with the general hospital; for the reason that many of the departments can be used in common, such as the drug room, the Roentgen-ray department, the laboratories, and physiotherapy departments, the heating plant, and, in emergencies, the service of members of the staff and nursing forces.

The size and shape of this department must be governed by the needs and the available space. If the call is small, it may be placed safely in the basement of one or more of the hospital buildings, or on certain floors set apart for this purpose.

Mackintosh* says, "The out-patient department should be a one-storied building, quite apart from the hospital."

Davis† prefers a two-storied, rectangular building with a central light court in the second story. If the plot of ground available is restricted, the building may be three or four stories, but not more than 36 to 40 feet in width.

Figs. 367 and 368 show an ideal rectangular plan. In the basement there is space for clinical records, lockers and lavatories for employees, and if the building is independent of a hospital, a drug store-room, general store-room, and the heating plant.

Fig. 369 shows one floor of a long rectangular plan, for a unit 36 feet wide. The admitting hall and administrative department are on the floor below.

The L-shaped building often affords a better division of departments than the rectangle, since the large waiting-room can be placed at the junction of the two wings, giving better supervision from the administrative center. (See Fig. 378.)

*"Construction, Equipment and Management of a General Hospital," by Donald Mackintosh, M.B.

†"Dispensaries," by Michael W. Davis and Andrew R. Warner; Macmillan, 1918.

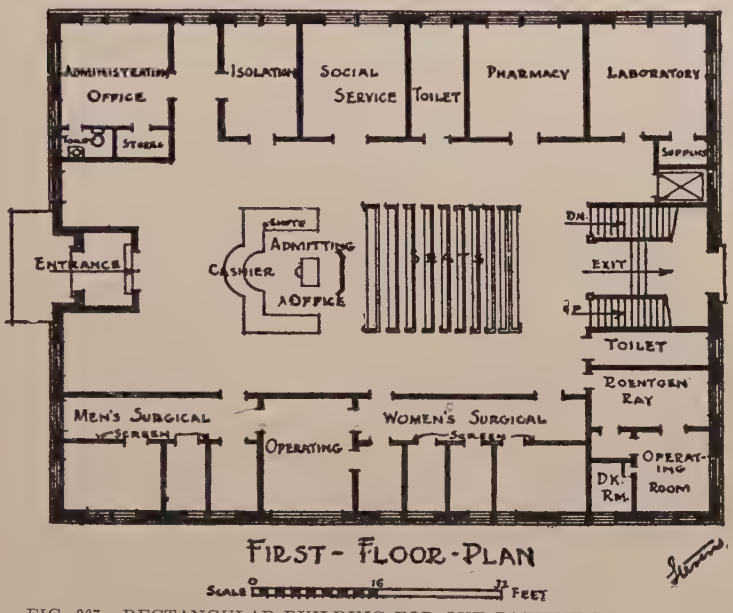



FIG. 367. RECTANGULAR BUILDING FOR OUT-PATIENT DEPARTMENT

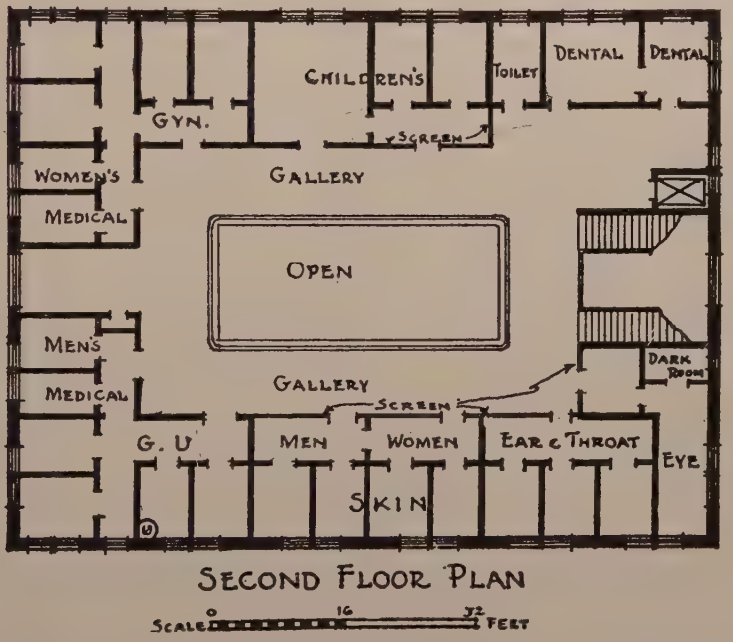



FIG. 368. RECTANGULAR BUILDING FOR OUT-PATIENT DEPARTMENT

Davis sets the following standards: "In locating an out-patient building with reference to the other buildings of the hospital it is to

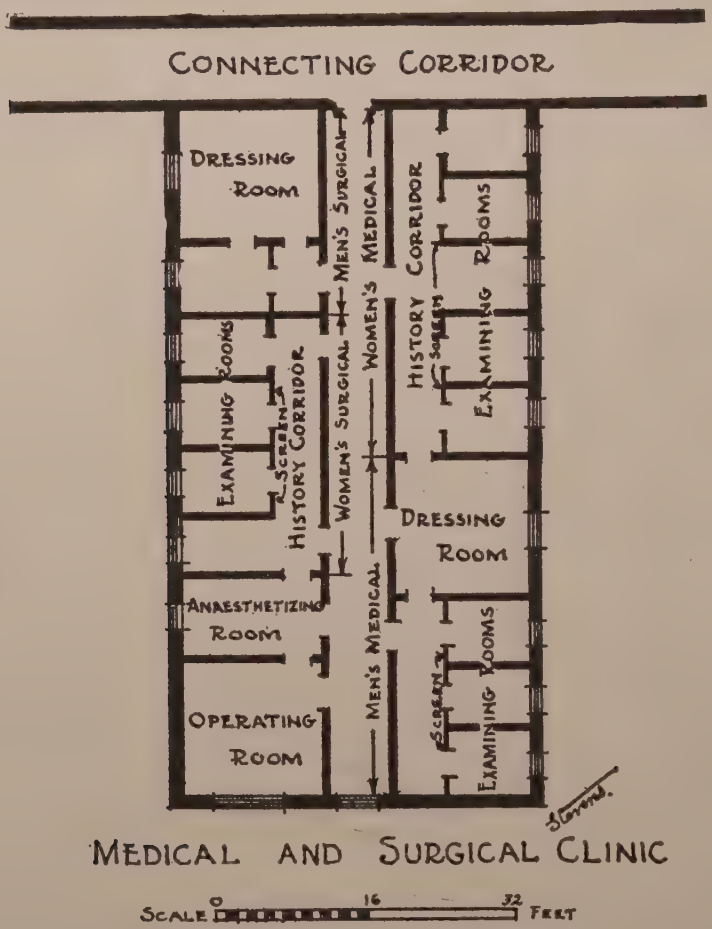



FIG. 369. LONG, RECTANGULAR BUILDING FOR OUT-PATIENT DEPARTMENT

be borne in mind that the dispensary may receive more patients than all the other parts of the hospital put together. Hence its entrance should be as accessible as possible from the main streets, and yet not be so placed as to interfere with ambulances, automobiles, patients or visitors coming to the building. It is highly important that the laboratories of the hospital and the X-ray department shall be accessible to the dispensary, so that examinations of either kind can be made with the least possible transference of patients.

"If the dispensary is located in one wing of a group of hospital buildings, it is most desirable to have this wing close to the main

administrative portion of the hospital. Large numbers of patients are referred to and from the dispensary and the wards. The record rooms for the hospital and dispensary are best managed if close together."*

Davis emphasizes the need of adequate space for admission, and the provision of rooms for individual attention and private conference. He insists upon plenty of light and air, and calls attention to the advantage of planning flexible units, which can be used for different clinics on different days, thus avoiding having rooms idle and empty while others are crowded.

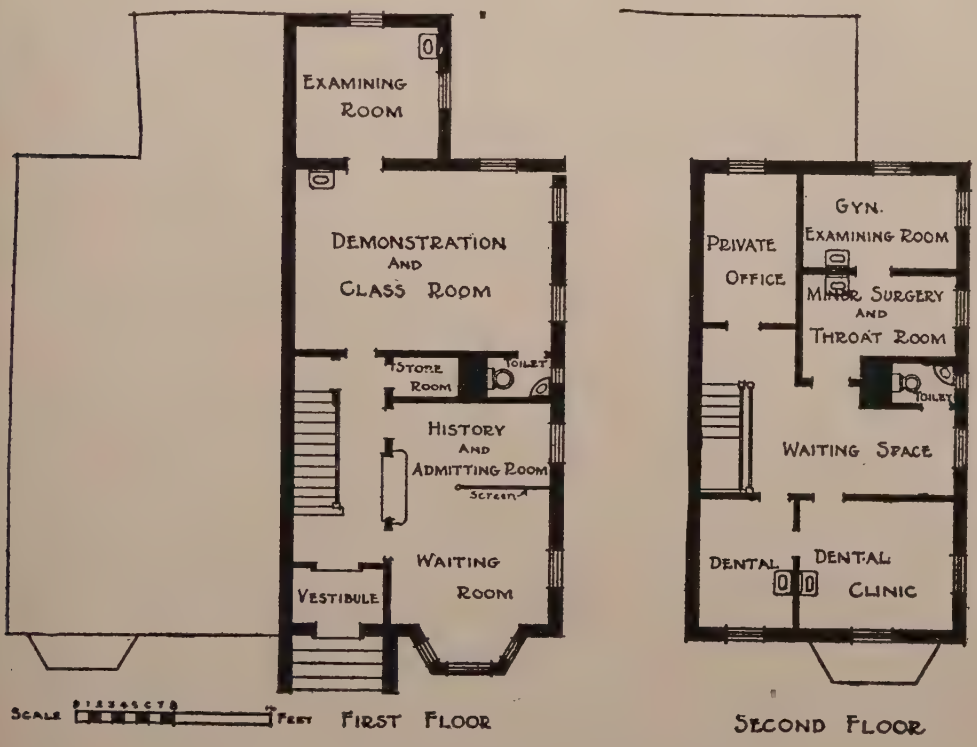



FIG. 370. HOUSE REMODELED FOR HEALTH CENTER

*Principles.* Whether this department be in a separate building of one story or multi-story, or connected with any other department, there are certain practical principles to be considered.

The entrance should be large and well protected from storms. As many of the out-patients are children-in-arms, adequate provision must be made for perambulators at or near the street level.

*"Dispensaries," by Davis and Warner; Macmillan, 1918.

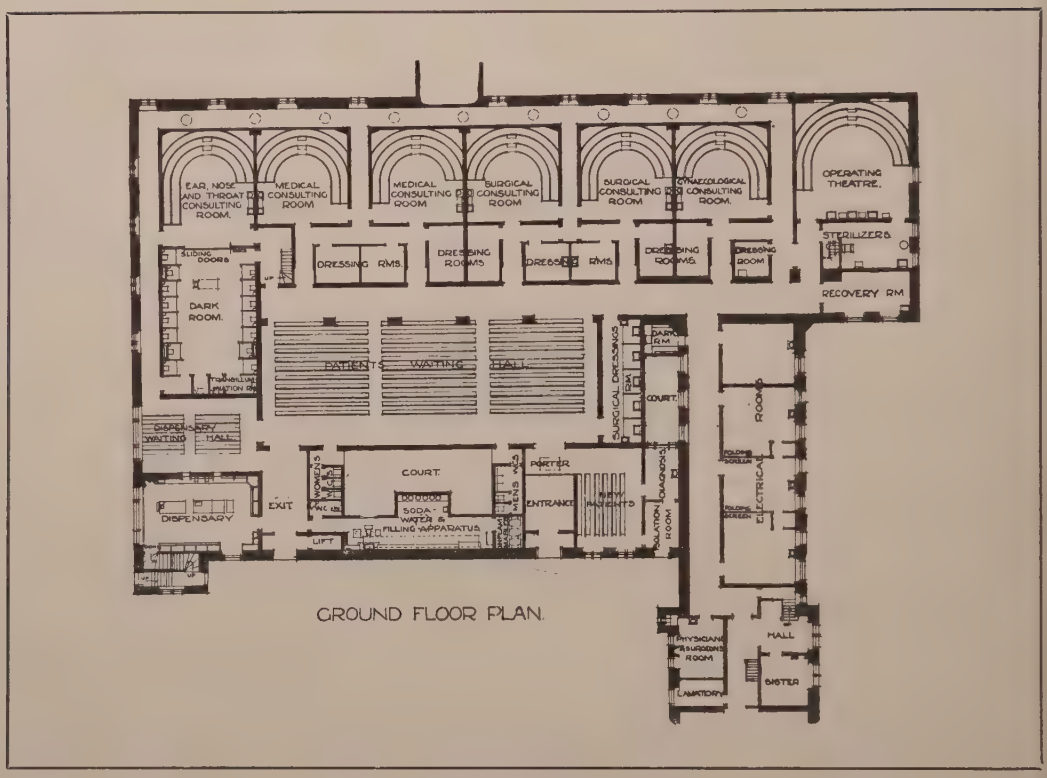



FIG. 371. OUT-PATIENT DEPARTMENT, WESTERN INFIRMARY, GLASGOW, SCOTLAND

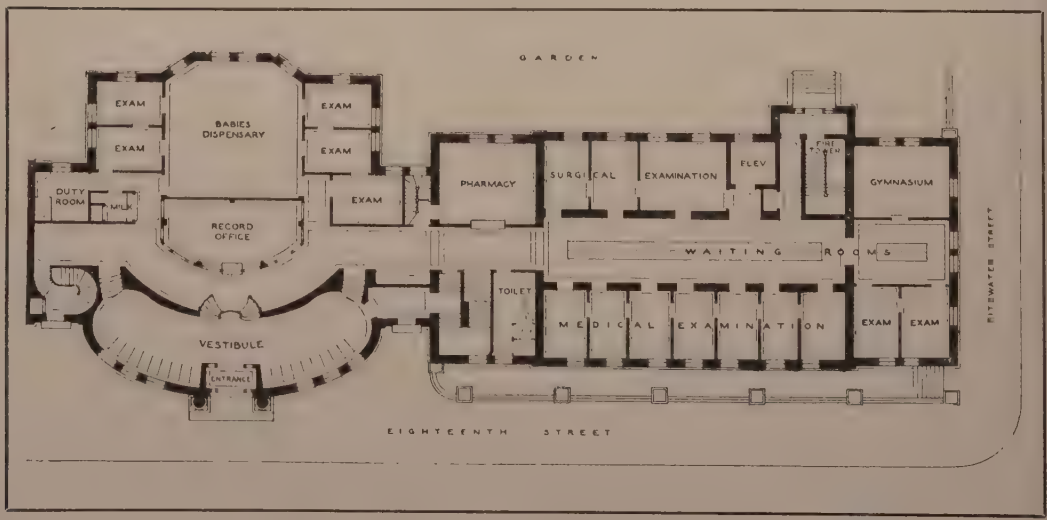



FIG. 372. OUT-PATIENT DEPARTMENT, CHILDREN'S HOSPITAL, PHILADELPHIA, PA.

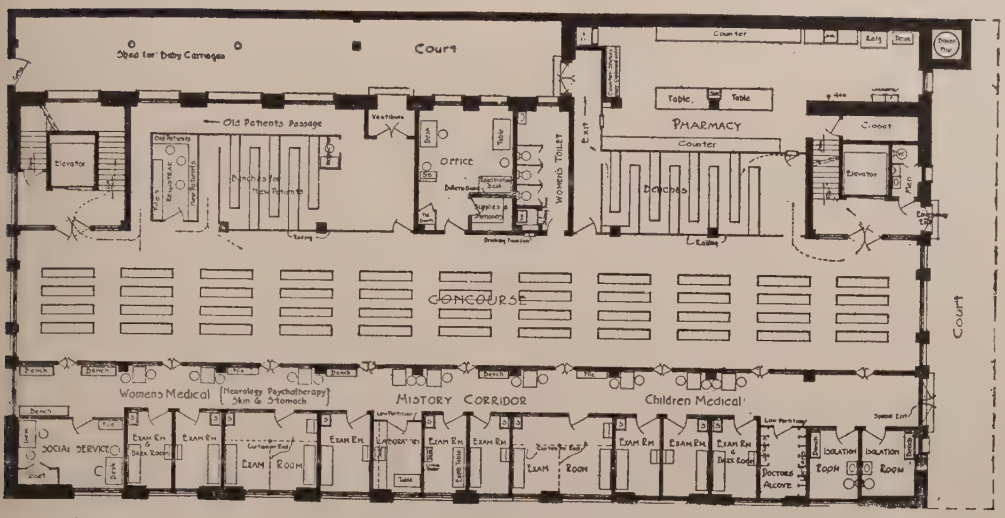



FIG. 373. FIRST FLOOR, PROPOSED OUT-PATIENT DEPARTMENT FOR NEW YORK CITY
Designed by S. S. Goldwater, M.D.

Where practicable, the exit should be a separate door. Near this door can be located the laboratory and the pharmacy.

Near the entrance should be the office of the department, the examining rooms, and the social workers' office.

The waiting-room should be large, well lighted, and, above all, well ventilated and centrally located, with the seating space so arranged as to give perfect circulation and prevent congestion. There must be space for new patients to wait near the admitting desk, for old patients until their turn comes for examination or treatment, and for pharmacy patients while their medicine is being prepared.

Near the preliminary examination desk there should be isolation rooms with a separate exit, for any suspicious or contagious case.

The arrangement and division of departments may depend on the respective service.

There must be ample room for all clinical records, so arranged that they may be easily and quickly consulted. Additional space will be required for future records, and for storing those not often consulted.

There must be room reserved for the executive offices.

Laboratory and X-ray departments of considerable elaboration are necessary, unless those belonging to the hospital are available; likewise a good pharmacy.

In the small service, by the use of different rooms at different hours and by a slight change in equipment, the treatment of the different diseases can be accomplished; in fact, splendid work can be

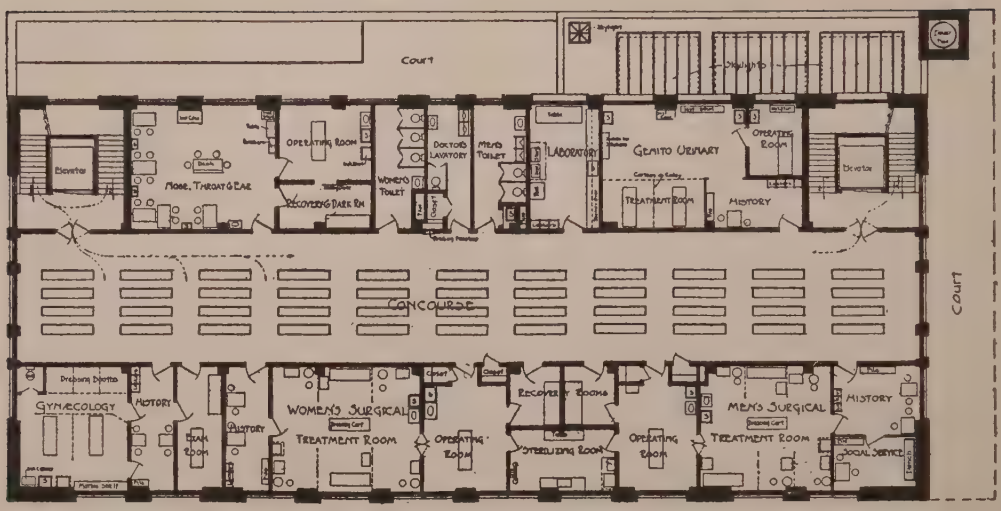



FIG. 374. SECOND FLOOR, PROPOSED OUT-PATIENT DEPARTMENT FOR NEW YORK CITY
Designed by S. S. Goldwater, M.D.

done in a very small space. But the ideal out-patient department should have space and divisions for general medical clinic, children's clinic, surgical clinic, gynecology clinic, venereal clinic, genito-urinary clinic, eye-ear-nose-and-throat clinic, and dental clinic; and as the department grows, separate space should be provided for orthopedic, nervous and mental diseases, and for the treatment of tuberculosis, whooping cough, and vaginitis.

A special clinic may be needed for poliomyelitis cases.

The work of examination and treatment is facilitated if provision is made for patients to wait at or near the treatment rooms. In some cases, separate waiting-rooms or history corridors are provided where the assistants can take down the history and prepare the patient for examination or treatment.

In providing for the clinics, the larger services, such as the medical and children's services, should be located on the entrance floor, in order to avoid congestion. The orthopedic, with the plaster work and brace shop, may well be located in the basement.

As to the size of the treatment rooms, there may be a difference of opinion; one man may wish a large room with, perhaps, cloth screens dividing the patients; another, a small room opening from the general room of that service, where any conversation will not be overheard by the patients nearby. If the small room is used, the ventilation should be assured and positive. If the rooms are to be used for teaching purposes, they should be of larger size.

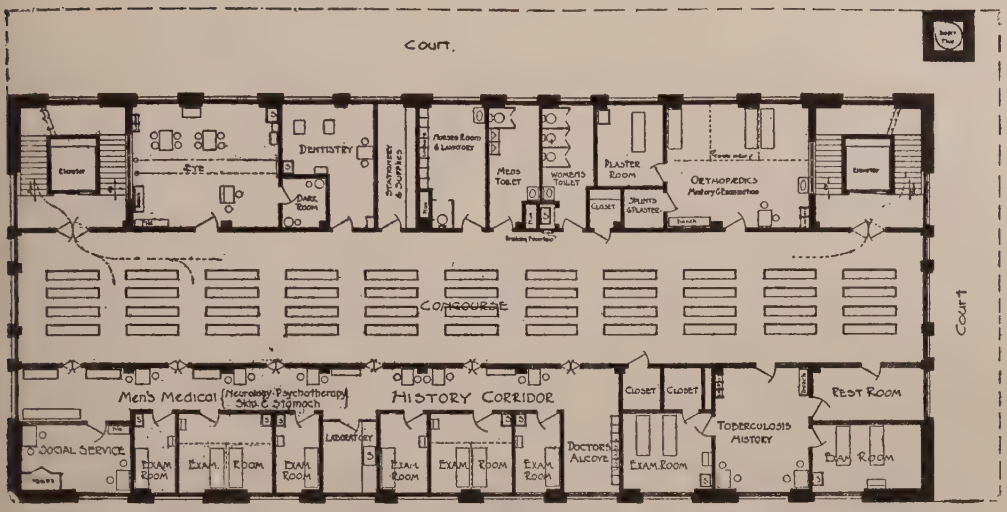



FIG. 375. THIRD FLOOR, PROPOSED OUT-PATIENT DEPARTMENT FOR NEW YORK CITY
Designed by S. S. Goldwater, M.D.

In the surgical department, there may be the complete operating room with its adjuncts—the sterilizing and anesthetic room; and if many of the minor operations are performed under anesthetics, recovery rooms should also be provided.

Each clinical division should be made a complete working unit, with proper plumbing fixtures, cabinets, and supplies for disinfecting against contagion, and apparatus for sterilization of instruments, etc.

The waiting-room should not be void of artistic merit, for even with the out-patient, the environment should tend to benefit the mind as the treatment does the body.

"Hospital finish" is necessary, since numbers of people mean much dirt, and cleaning must be made easy. The floors get much harder use than those in the hospital; they should be non-absorbent and readily scrubbed. The walls, ceilings and furniture should be of simple design and easily cleaned.

Good lighting, both for day and night, is essential.

Even a two-story building should have an elevator, for cardiacs, feeble, lame, mothers with babies to carry, etc.

Drinking water and paper cups should always be available.*

There should be ample toilets, both for patients and staff.

Davis gives the following list of rooms needed in a small out-patient department: (1) Admission hall, with booths for admitting,

*Further elaboration of these points will be found in Davis and Warner's book, in the chapter on buildings.

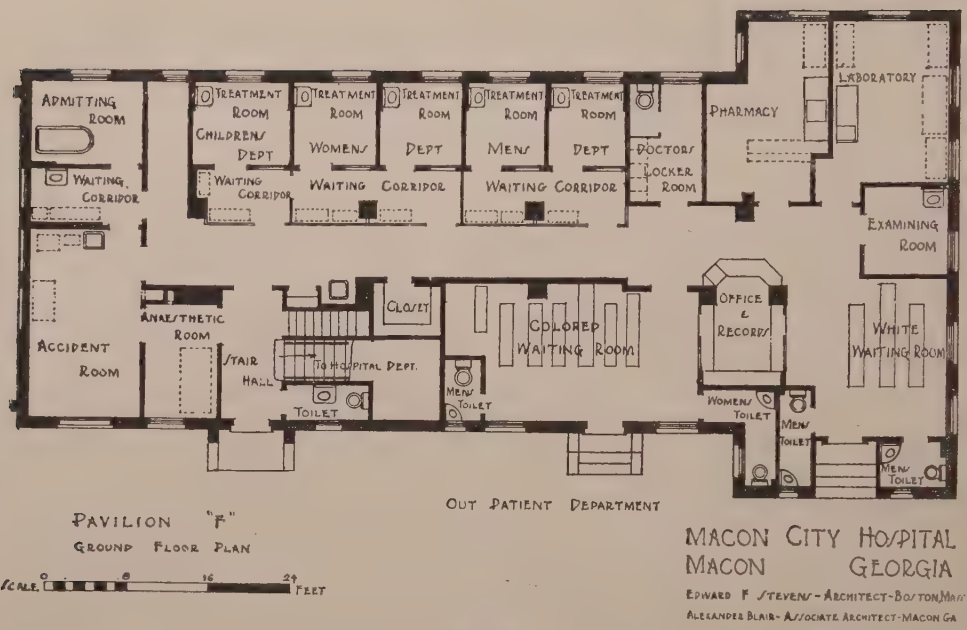



FIG. 376

records and social service. (2) Pharmacy. (3) Medical clinic, two rooms or one with a booth partitioned off. (4) Surgical clinic, three rooms. (5) Children's clinic, one room. (6) Eye, ear, nose and throat clinic, two rooms. (7) Dental clinic.

He also gives a plan for remodelling a house so that it can be used as a health center and dispensary combined (Fig. 370).

The pay clinic has come into existence, and facilities for handling it will doubtless be demanded shortly. This should be borne in mind in planning a new out-patient department.

A more complete out-patient department is hardly to be found than that of the WESTERN INFIRMARY at Glasgow (Fig. 371). From the time the patient enters until he leaves, it is not necessary for him to cross his own path. He finally comes up in front of the dispensary and goes thence to the exit.

At the entrance is the preliminary waiting-room for new patients, with its isolation and diagnosis room; then the large central waiting-room; the special treatment room for eye, ear, nose and throat; for minor dressings; and the various surgical and medical clinic rooms, with dressing-rooms connected; each unit a teaching theatre, with circular benches for students, with the dispensary near the exit.

A special students' entrance is provided, with corridor above and exit passage, connecting with each of the clinic rooms.

The first building of the CHILDREN'S HOSPITAL, Philadelphia, as planned, is for out-patients. Entrance is through a large vestibule arranged for the storage of baby carriages. A record office fills a commanding position. The babies' dispensary, with examining rooms and a milk and duty room adjoining, occupies the central position in the rear of the record desk. The medical and surgical examining rooms use the rest of the first floor (Fig. 372).

The plans show in the basement the detention room for suspected cases, a whooping-cough clinic having a separate entrance. The X-ray, orthopedic, and plaster rooms are on this floor. The eye, ear, nose and throat treatment and utility rooms are on the second floor; also the operating and recovery rooms. The third floor is occupied by the laboratories.

The plan of an ideal out-patient department suggested by Dr. S.

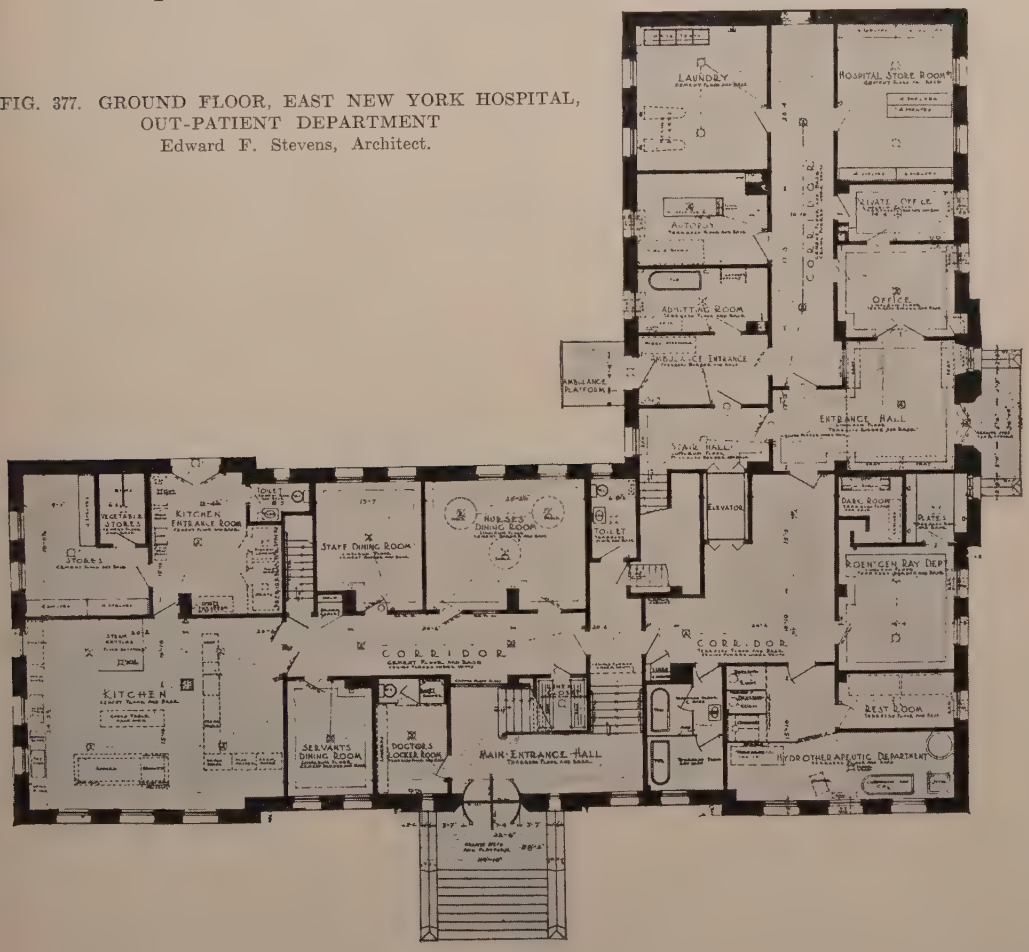



FIG. 377. GROUND FLOOR, EAST NEW YORK HOSPITAL, OUT-PATIENT DEPARTMENT
Edward F. Stevens, Architect.

S. Goldwater in Mr. Henry C. Wright's* report on City Departments of New York, shows the working out of a three-story out-patient department on a restricted city site with buildings adjacent. The plans (Figs. 373, 374, 375) show the possibilities of such a site and the placing of the rooms and corridors to conserve light, assure circulation, and afford ease in the handling of patients.

The small out-patient department (Fig. 376) of the MACON HOSPITAL, where the problem of serving the colored as well as the white must be met, shows the possibilities of even a small unit.

*Report of Committee on Inquiry into Hospitals and City Homes of New York City.

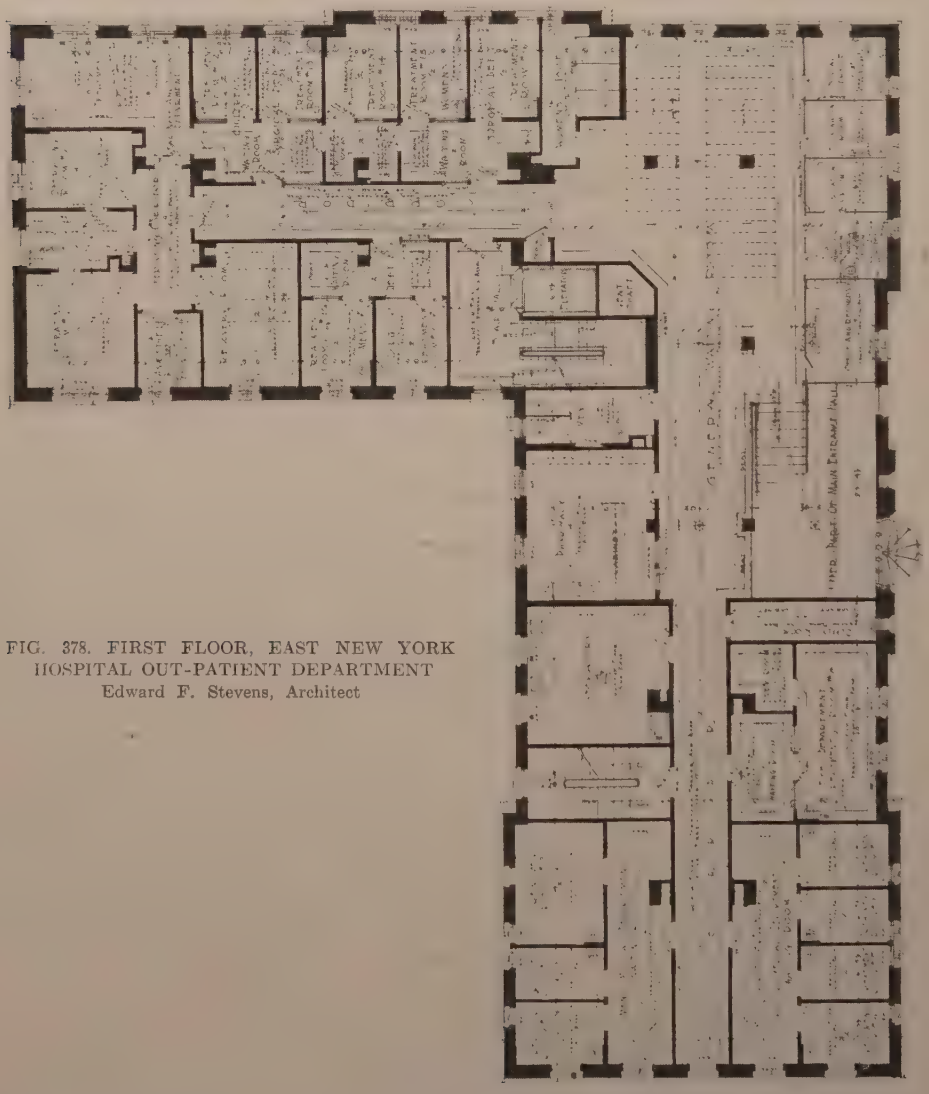


FIG. 378. FIRST FLOOR, EAST NEW YORK HOSPITAL OUT-PATIENT DEPARTMENT
Edward F. Stevens, Architect

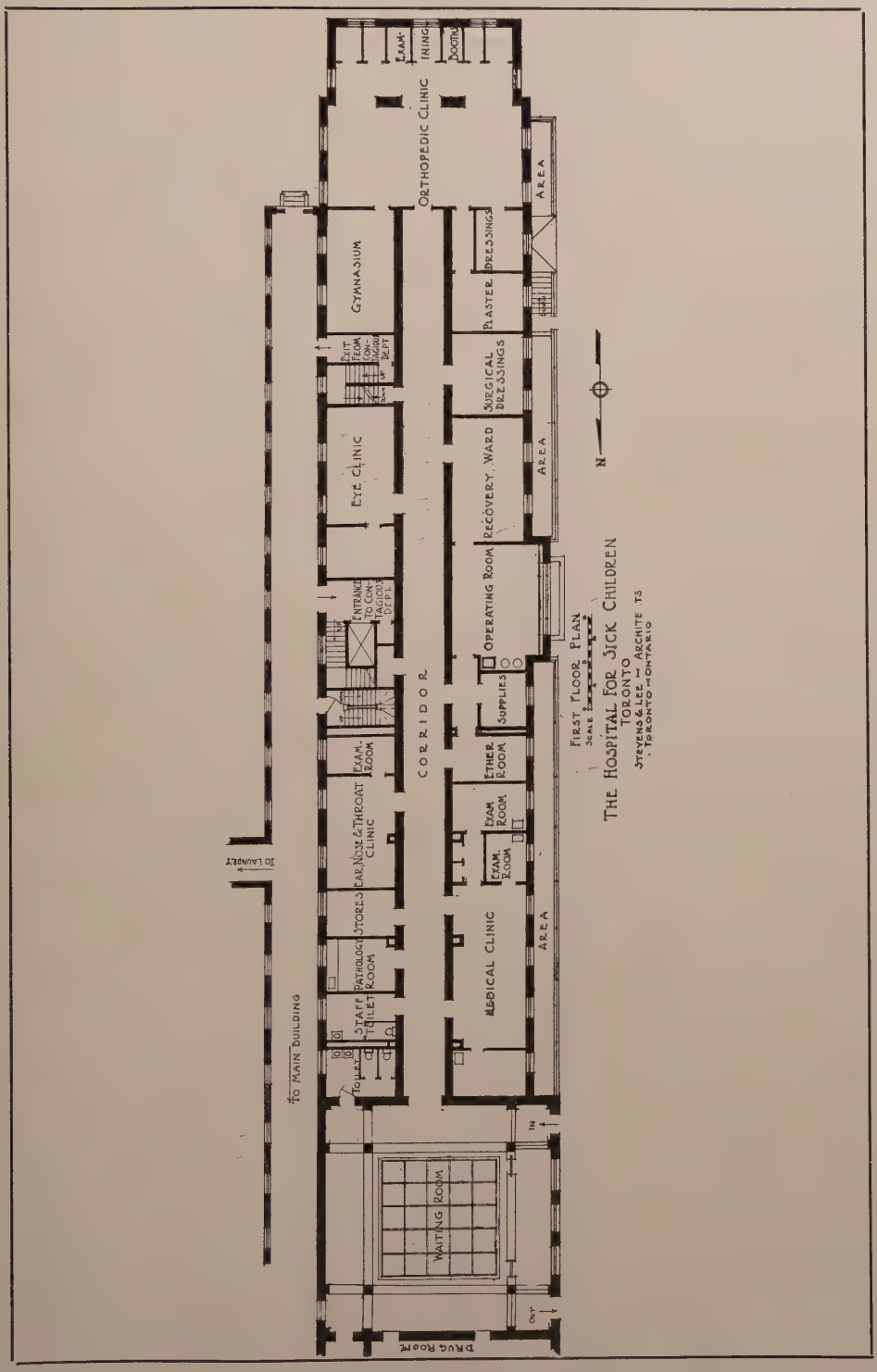
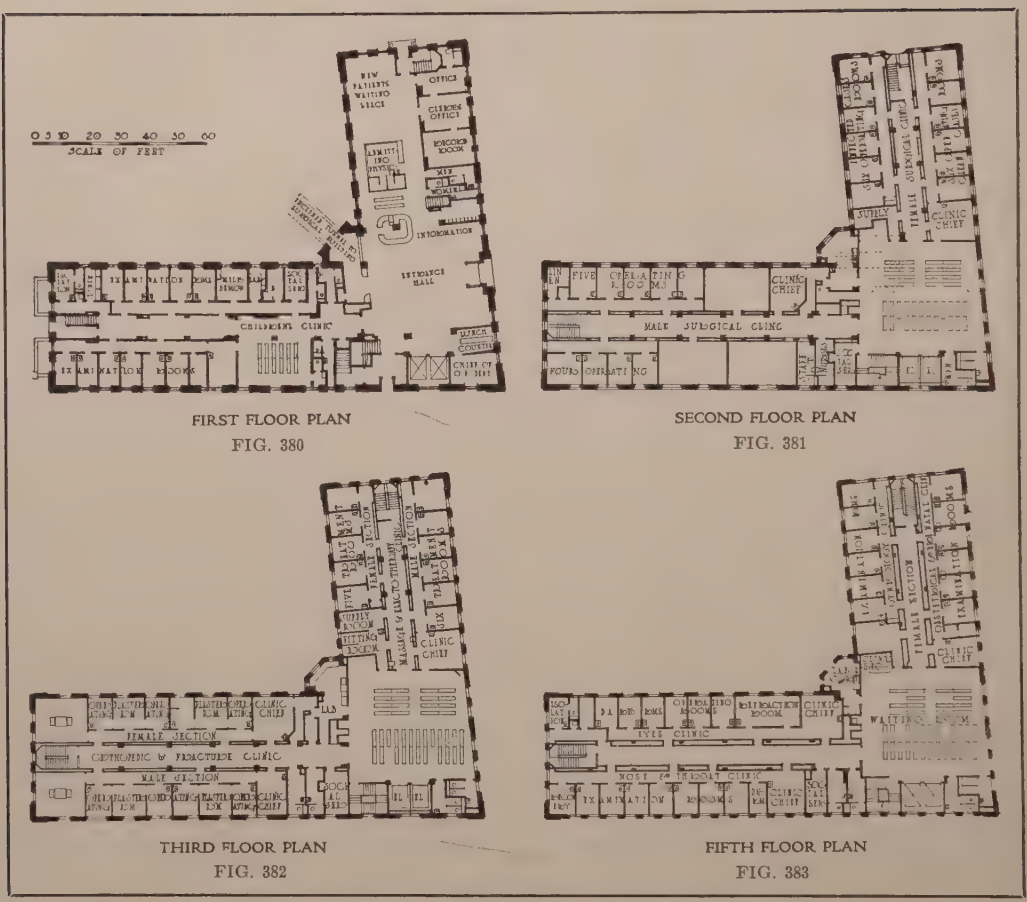



FIG. 379. OUT-PATIENT DEPARTMENT




FIRST FLOOR PLAN
FIG. 380

SECOND FLOOR PLAN
FIG. 381

THIRD FLOOR PLAN
FIG. 382

FIFTH FLOOR PLAN
FIG. 383

OUT-PATIENT BUILDING, BOSTON CITY HOSPITAL
Coolidge & Shattuck, Architects
Courtesy of *Arch. Forum*

The waiting-rooms for both white and colored are supervised from one desk. The treatment rooms, however, are not divided. A complete operating department is here provided, which will serve, to a certain extent, for minor operations for the colored patient, the wards for whom are on the second and third stories of this building.

The dispensary building for the East New York Hospital, for the time being, will serve for dispensary and hospital. As shown by Figs. 377 and 378, a portion of the ground floor and all of the second will be used for out-patient service. Worked out on the "L" plan, with the waiting-room at the junction of the two wings and with the administration and examining rooms, the social service office, the pharmacy, and the laboratory in central locations, the problem of caring

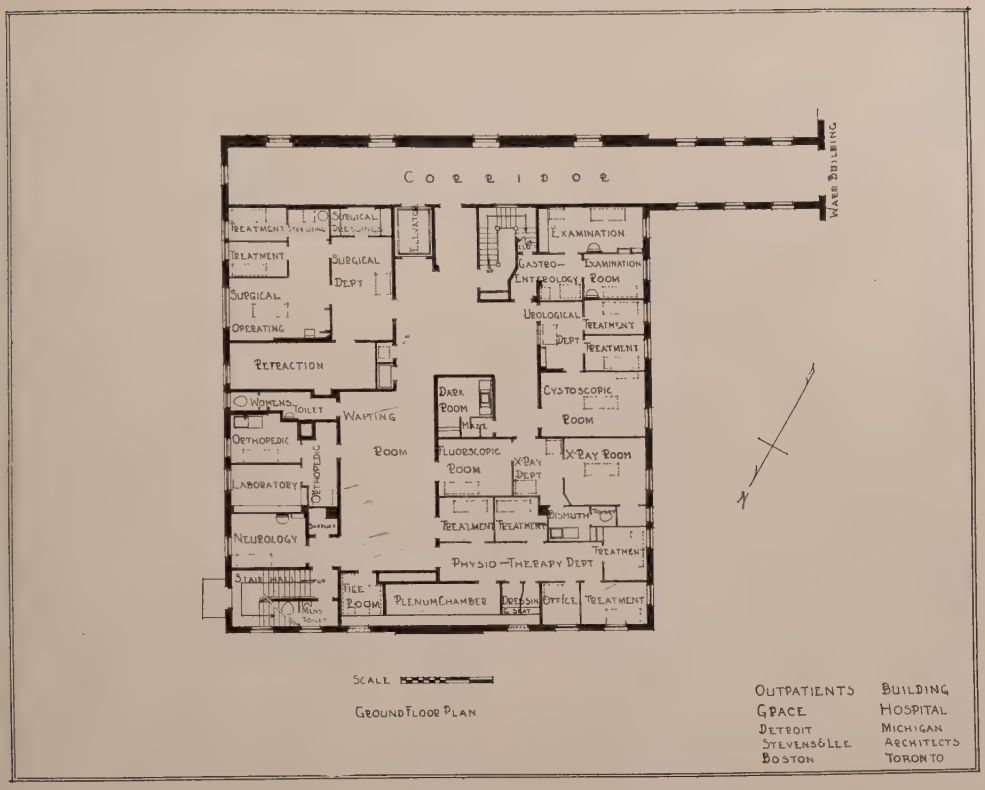



FIG. 384. GRACE HOSPITAL, DETROIT, MICH.

for the patients should be simple. The X-ray and hydro departments are on the ground floor.

While the in-patient work of the HOSPITAL FOR SICK CHILDREN, at Toronto (Fig. 379), and the work at the LAKESIDE HOME is tremendous, the out-patient work and the milk dispensary work are even greater. The entire ground and first floors of the new contagious wing and a large portion of the first floor of the old building are used for the out-patient work. The main waiting-room connects at the left with the pharmacy; the laboratories at the rear with the hospital and pasteurizing plant and at the right with the various departments, including medical, surgical, eye, ear, nose and throat, orthopedic, etc., while in the basement is a large measles clinic, and the brace and mechanical shops for making of apparatus.

The MAYO CLINIC, Rochester, Minnesota (Figs. 348-351), is a private out-patient building. The first floor is devoted to consultation rooms, the second to X-ray, microscopic work and to special examining rooms, eye, ear, nose, throat, cystoscopic, procotoscopic, etc., in-

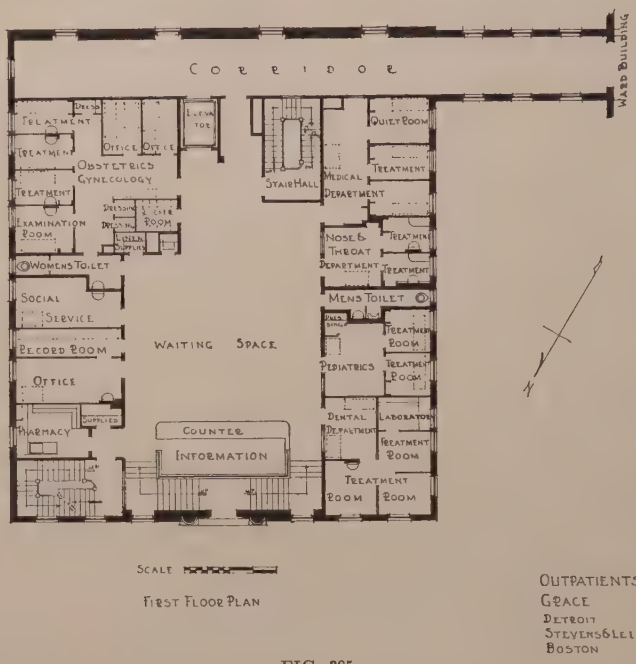



FIG. 385

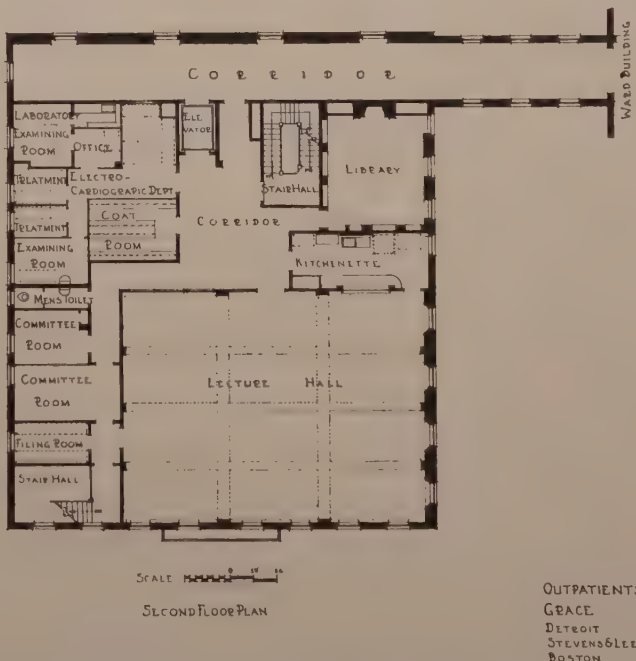



FIG. 385A

GRACE HOSPITAL, DETROIT, MICH.

FIG. 386. WAITING ROOM, OUT-PATIENT DEPARTMENT, OTTAWA CIVIC HOSPITAL, OTTAWA, CANADA

cluding provision for treatment. The third floor contains the pathological laboratories and the library. The fourth floor houses the pathological museum, the X-ray developing and storage, and various workshops. The roof contains the animal houses and experimentation laboratories. This is doubtless one of the best buildings of its sort in the country and may repay study, for its content, if not for its elaboration.*

The out-patient building of the Boston City Hospital, Boston, Massachusetts (Figs. 380-383), is considered most excellent. It is an L-shaped building of seven stories, the general admission department being on the ground floor, with a separate portion for new patients. There are two elevators, ascending to separate waiting-rooms on each floor. Each department has small examining and treatment rooms, closely connected with an office. The surgical, genito-urinary and eye divisions have small operating rooms. A lunch counter is provided for

*A detailed description appeared in the Journal-Lancet, August, 1914.

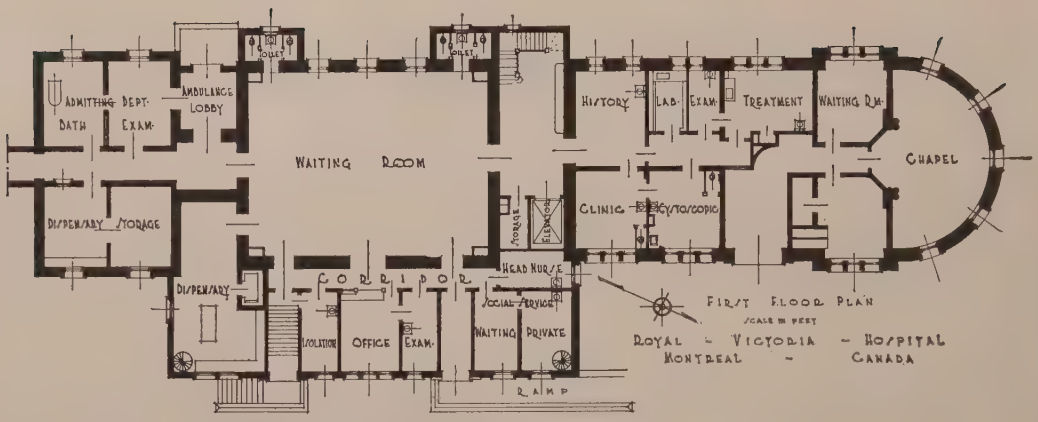



FIG. 387. FIRST FLOOR, OUT-PATIENT DEPARTMENT, ROYAL VICTORIA HOSPITAL, MONTREAL, QUEBEC
Stevens & Lee, Architects

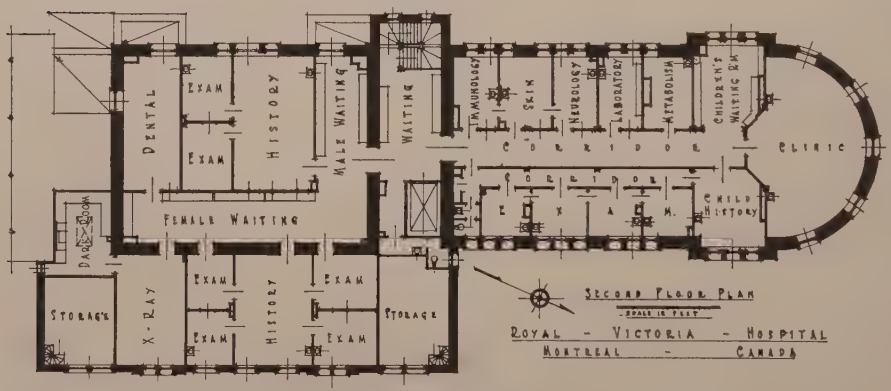



FIG. 388. SECOND FLOOR, OUT-PATIENT DEPARTMENT, ROYAL VICTORIA HOSPITAL, MONTREAL, QUEBEC
Stevens & Lee, Architects

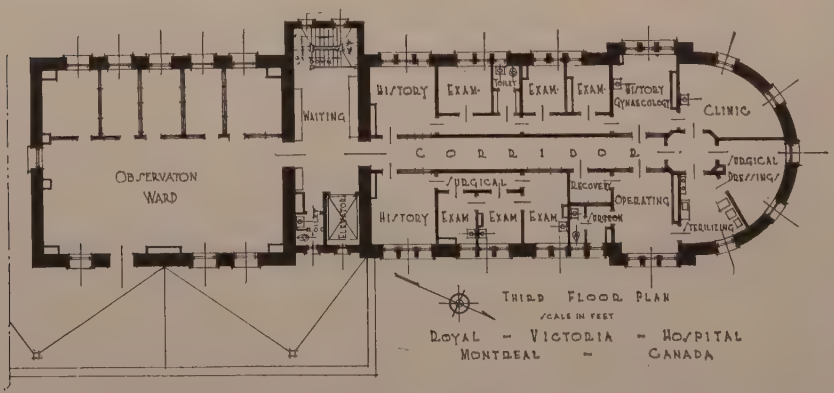



FIG. 389. THIRD FLOOR, OUT-PATIENT DEPARTMENT, ROYAL VICTORIA HOSPITAL, MONTREAL, QUEBEC
Stevens & Lee, Architects

those who come long distances or must wait for doctors. There is a special division for physiotherapy.

There is a social service office on each floor, also a laboratory. There is a large record room on the mezzanine floor, and an automatic system of carriers whereby records may be sent to or received from any department; these carriers are similar to those used for cards in large public libraries.

In the out-patient department of Grace Hospital, Detroit, Michigan (Figs. 384-385A), the main entrance is on the first floor. Here is a large waiting-space in the center, with information desk in plain sight. Around this waiting-room are grouped various departments, with examining, treatment, and dressing rooms. To the left is the office and record room, pharmacy and social service office. On the ground floor, are other departments, including X-ray and physiotherapy. On the second floor there is a large lecture hall, a library, committee rooms, coat rooms, a kitchenette, and a department for electro-cardiographic work. There are two stairways and an elevator connecting the three floors.

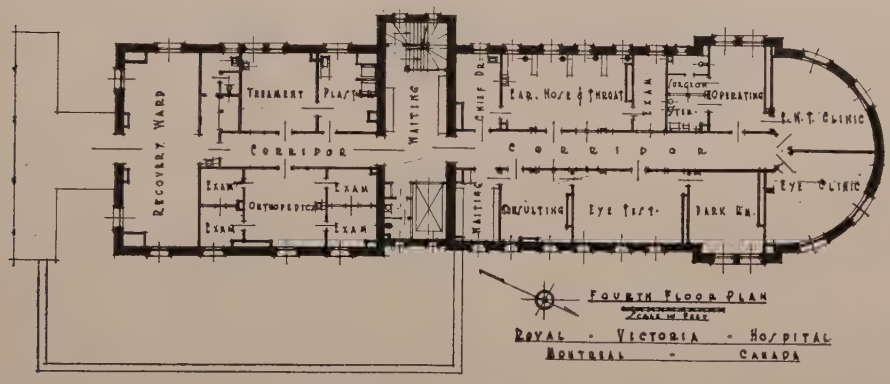



FIG. 390. FOURTH FLOOR, OUT-PATIENT DEPARTMENT, ROYAL VICTORIA HOSPITAL, MONTREAL, QUEBEC
Stevens & Lee, Architects

At the Royal Victoria Hospital, Montreal, Canada, the building formerly used for pathological work has been remodelled for out-patient service (Figs. 387-390).

The large waiting-room on the first floor is the center, with office, pharmacy and a special isolation room for suspected cases near by. Both in and out patients are admitted here. The second floor provides history-taking and examining rooms, dental clinic, neurological clinic, and the X-ray department. On the third floor are waiting-room, operating room and dressing rooms for surgical and gynecological

cases. There is also a large children's ward, partly open and partly with cubicles for isolation. On the fourth floor is the orthopedic department, with plaster and treatment rooms. The eye, ear, nose and throat clinics are here, the latter having a specially designed booth for treatments (Fig. 606). There is a recovery ward for tonsil and adenoid cases, near the children's ward of the main hospital.

The plan of the out-patient department of the Ottawa Civic Hospital, Ottawa, provides for a considerable service (Fig. 85). It is divided into many small units for examination and treatment. There is a plaster room, a gynecological treatment room, a dental

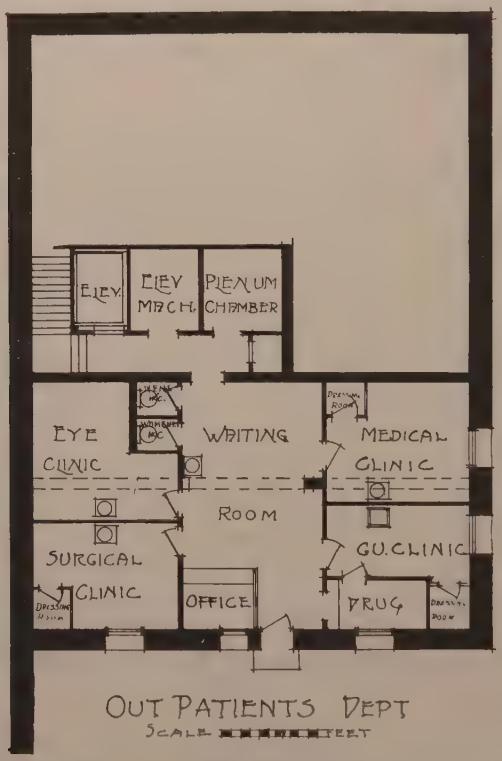



FIG. 391. OPERATING BUILDING, YOUNGSTOWN HOSPITAL, YOUNGSTOWN, OHIO
Edward F. Stevens, Architect
Stanley & Scheibel, Associate Architects

clinic, a special department for eye, ear, nose and throat. Rooms for the operation of tonsil and adenoid cases and for their recovery are provided.

The Robinson Memorial of the Massachusetts Homeopathic Hospital, Boston (Figs. 204, 205), contains an excellent out-patient

FIG. 392. CLINIC BUILDING, WELLESLEY FRIENDLY AID ASSOCIATION, WELLESLEY HILLS, MASS.

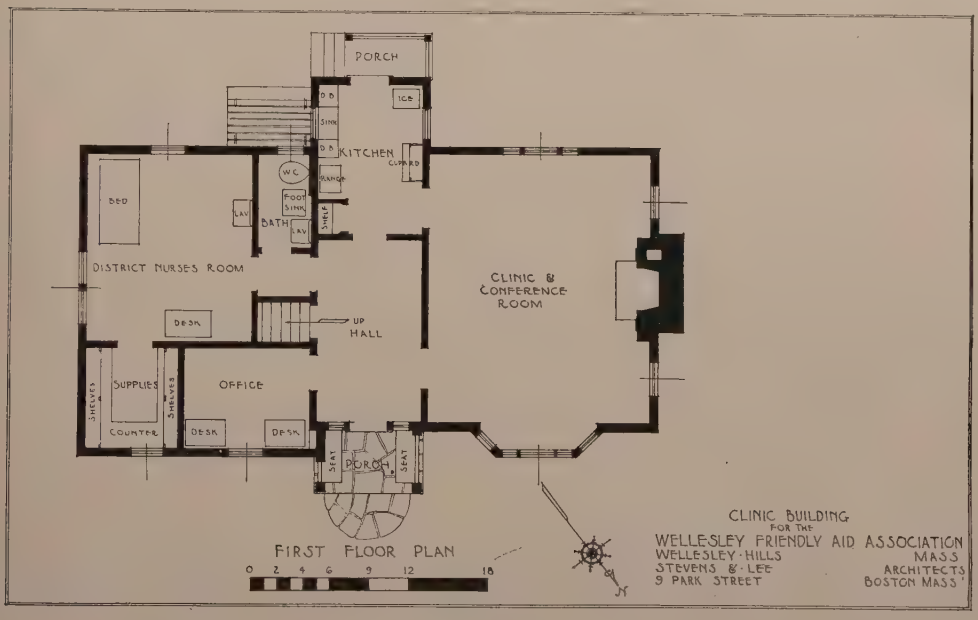



FIG. 393

FIG. 394. FIRST AID BUILDING FOR FACTORY
Edward F. Stevens, Architect

department. In the YOUNGSTOWN HOSPITAL, Youngstown, Ohio, the department is small, but planned for the needs of this particular hospital (Fig. 391). Another example of a small department will be

found in the Ohio Valley General Hospital, Wheeling, West Virginia (Fig. 107).

The clinic building for the Wellesley Friendly Aid Association, Wellesley Hills, Massachusetts (Figs. 392 and 393), provides a conference room, an office, a demonstration kitchen, and a room for the district nurse, of such a size that minor accident cases can be cared for in it.

*Industrial First-Aid Buildings.* There is now hardly a factory or shop of any size without some form of first-aid equipment. Many factories and mills have rooms set apart for first-aid and surgical dressings, with a doctor or a nurse in attendance; some provide a place where the mother-worker can bring her baby and have it cared for under wholesome, hygienic conditions. A building which combines these two functions is shown herewith (Figs. 394, 395). It is planned to be built on the spacious grounds of a Massachusetts cotton mill, and will serve four purposes: (1) for dressings and minor ac-

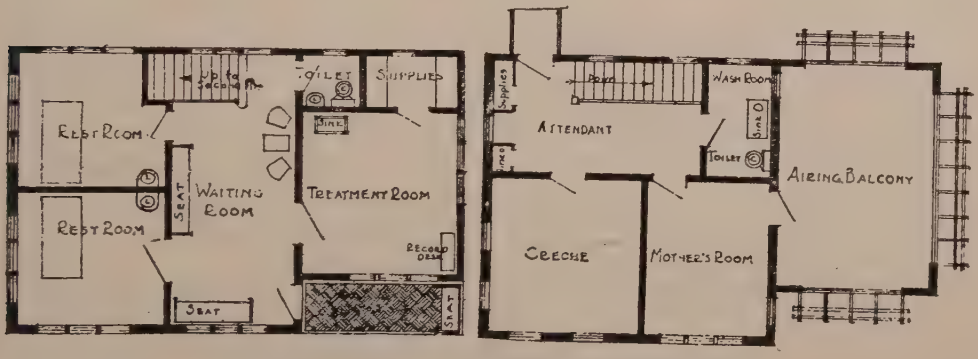



FIG. 395. FIRST AID BUILDING FOR FACTORY

cidents; (2) for recovery and rest rooms; (3) as a creche for the babies of the workers; (4) for a mothers' room.

From the mill yard one enters the main waiting room, which occupies the entire width of the building. Next this is the dressing room, equipped for minor surgical work of many sorts. There are two small wards or rest rooms, each equipped with hot and cold water; there are toilets and supply closets.

On the second floor, reached by the staircase or a bridge from the mill, is the creche or nursery. Here a mother may have her baby cared for under the direction of a nurse. Adjoining the nursery is a mothers' room. An airing balcony increases the capacity and adds to comfort in the warmer months. The exterior walls and the porch

floors are of brick. The flat roof is of mill construction, slightly camouflaged by projecting rafters.

### THE SOCIAL SERVICE DEPARTMENT

While the social service work in connection with hospitals and out-patient departments is a development of recent years, nevertheless it has become a most important and necessary adjunct. It is truly a twentieth-century development, starting in Boston in 1905 through Dr. Richard Cabot, who introduced the social worker as a means of securing more accurate diagnosis and rendering more effective treatment.

The social worker co-operates with the clinician. Together they take the history, one examines the patient, the other "investigates the social cause of the ailment." The physician prescribes; the social worker "follows up" the homelife, sees that the instructions of the physician are carried out, and encourages better home environment. It is obvious that if the instructions of the medical man in the clinic are not carried out, the time is wasted and the patient returns without benefit. The social service worker renders here invaluable service to the hospital, to the dispensary, and to the public.

A very large number of hospitals have added this department, and their number is increasing rapidly. No new hospital should be built, nor an addition made to an existing building, without provision for it.

The chief requirements for social service offices are:

1. They should be easily accessible from the out-patient department, and from the admitting department of the hospital proper.
2. The department should be divided into small rooms (not booths), so that all interviews may be strictly private.
3. There should be space for filing cabinets, easily accessible to all the interviewing rooms. These cabinets should be locked when not in use, as the records are confidential.
4. There should be space for a clerk or stenographer outside the interviewing rooms. The record cases and the stenographer's desk may be in the waiting room.
5. Opportunity for expansion should be afforded.

In the newer buildings more and more space is being given to social service, since it is now recognized as a vitally important adjunct to both out-patient and hospital work.

# CHAPTER XIV

## THE SMALL HOSPITAL

THE development of the small hospital is largely American. While the village or small hospital may have started in England, as stated by Taylor*, the greater development has been in this country. One can find hundreds of well-planned hospitals of fifty to one hundred beds; but for the smaller private hospitals, one is more likely to find the adaptation of some dwelling, doing good service but handicapped at every turn for lack of conveniences for economical and efficient work.

The same standards of number and size of utilities are not applicable to a fifteen-bed that would be suitable for a fifty-bed establishment, for it would be all utilities, with no room for patients.

In the very small hospital there is not the need for the separation and segregation of utilities; one room may serve for toilet, sink and bath; food may be taken directly from the kitchen to the patient, the operating room may serve for both surgical and maternity work.

It must, however, in order to maintain proper standards, have its X-ray department, a good laboratory, and proper facilities for the keeping of records.

Even in the small hospital the life of the patients should be safeguarded; and the construction, the egress, the careful consideration of the patient are just as important as in a large plant. Fireproof construction may not be absolutely necessary but is always desirable, and is generally an economy in the end.

It is possible, however, to meet modern requirements in the small village hospital and at moderate expense, and the examples following will show the solution here of several problems. However small, each institution must be balanced for its special location and purpose.

Special difficulties are encountered in planning the small hospital, especially on the first or ground floor; patients must be cared for here, yet utilities must not be obvious or offensive to incoming patients or guests. This problem has been more or less successfully solved in the first prize plan (Fig. 445), the GOOD SAMARITAN HOSPITAL, Sandusky, Ohio (Fig. 425), DR. WILLIAMS' SANITARIUM, Macon, Georgia (Fig. 396), the MASON HOSPITAL, Clarksburg, West Virginia (Fig. 421), the SOLDIERS' AND SAILORS' MEMORIAL, Penn Yan, New York (Fig. 430), the MARY LANE HOSPITAL, Ware,

*Brickbuilder, January, 1904.

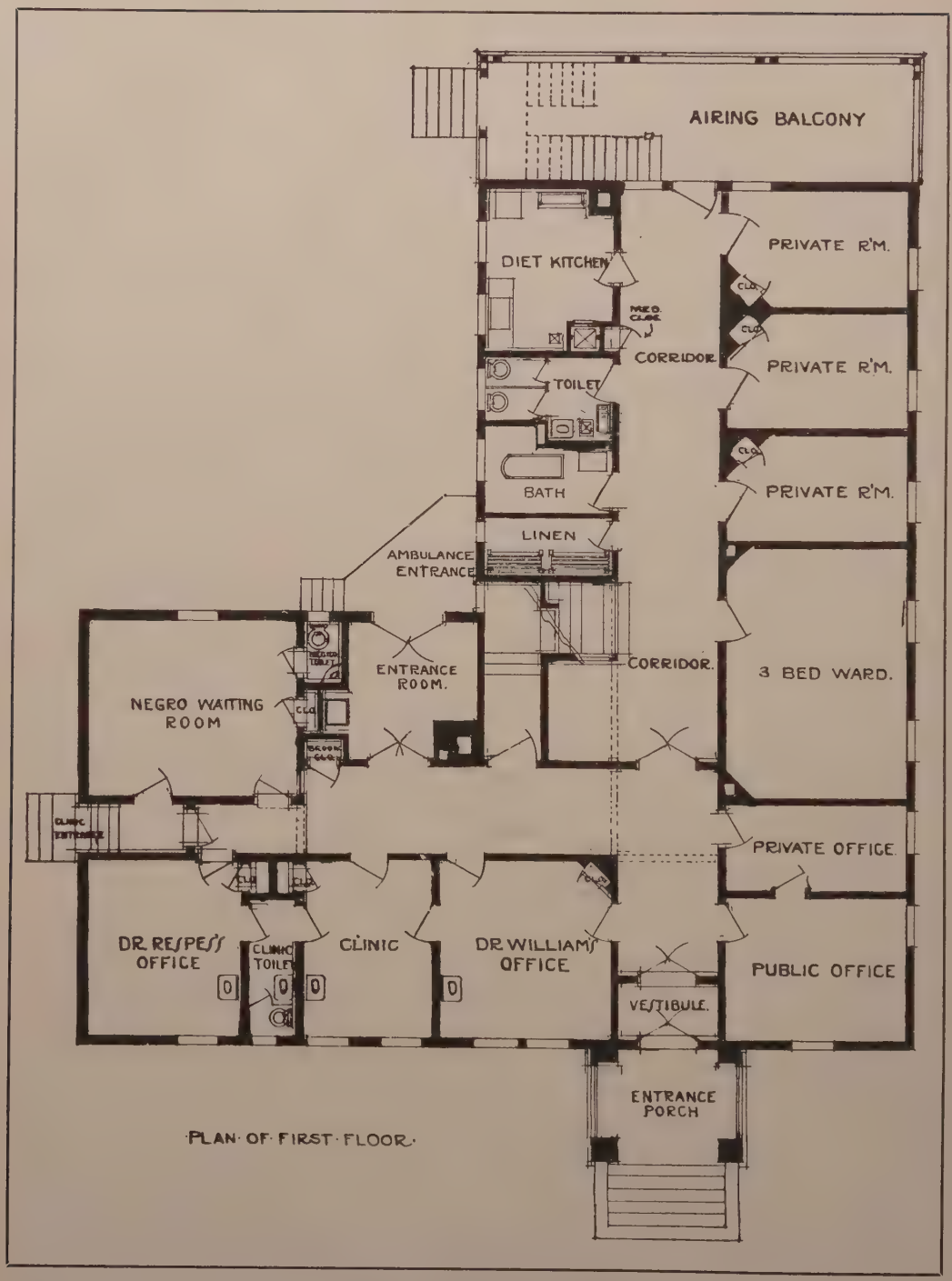



FIG. 396. WILLIAMS' PRIVATE SANATORIUM, MACON, GA.
Edward F. Stevens, Architect

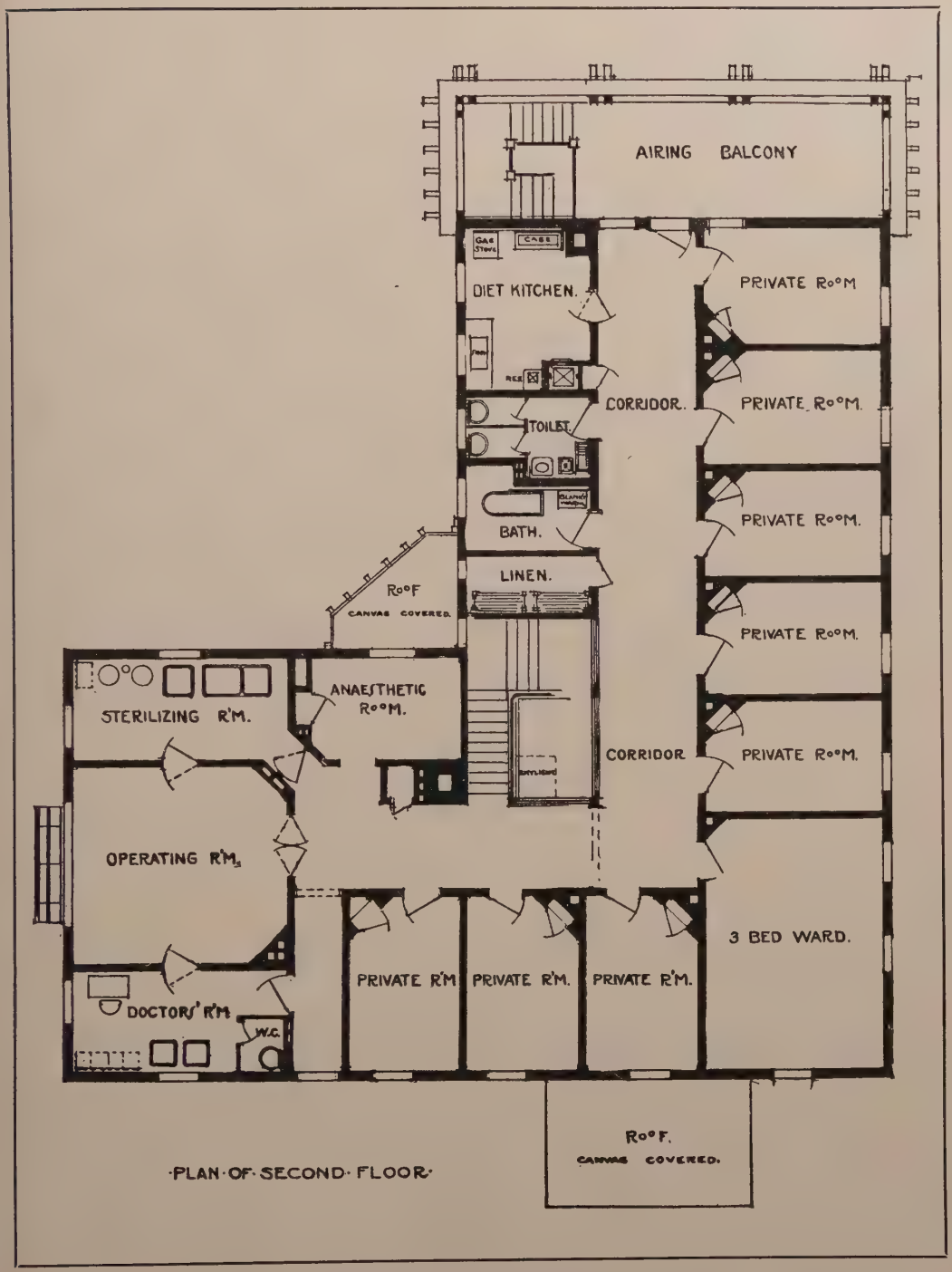



FIG. 397. WILLIAMS' PRIVATE SANATORIUM, MACON, GA.
Edward F. Stevens, Architect

FIG. 398. WILLIAMS' PRIVATE SANATORIUM, MACON, GA.
Edward F. Stevens, Architect

Massachusetts (Fig. 438), and the PRESQUE ISLE HOSPITAL, Presque Isle, Maine (Fig. 441).

Other important considerations are: the location of kitchen and laundry, so that their odors shall not reach patients directly; that the elevator shall be near to operating room and to serving kitchens; that operating room and nursery shall be so located as not to disturb patients. Nurses should be housed in a separate building, but if they must be in the hospital itself, a top floor is best, with sound-proofing provided for the ceilings of rooms which are directly underneath.

In the DR. WILLIAMS' PRIVATE SANATORIUM, Macon, Georgia (Figs. 396-398), the problem was to provide for the care of both medical and surgical cases, for offices, and for an out-patient department for colored people.

The contour of the land gave the advantage of being able to place kitchen, dining-room, and store rooms in the basement and still get proper light.

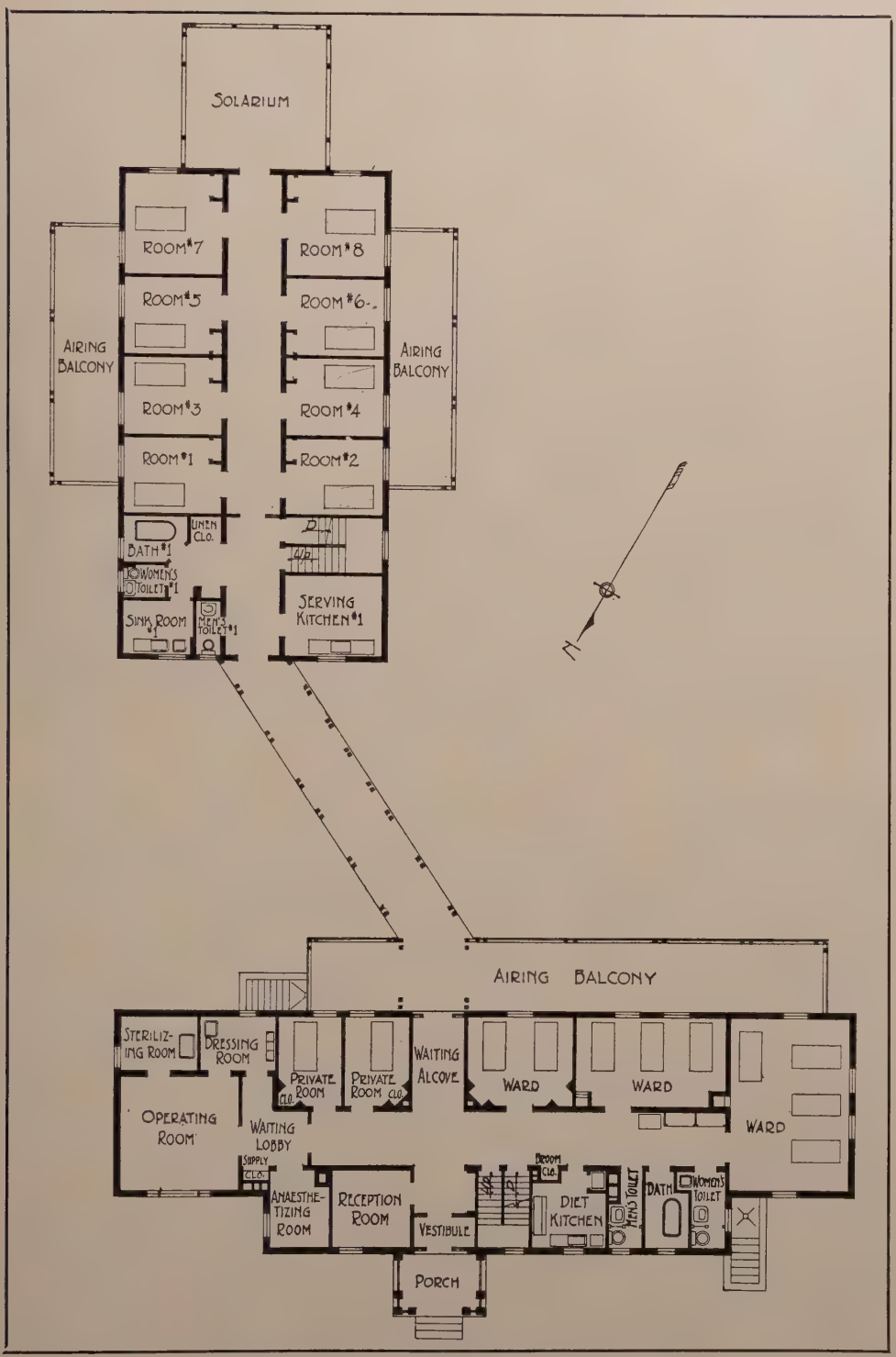



FIG. 399. DEACONESS HOSPITAL, CONCORD, MASS.
Edward F. Stevens, Architect

FIG. 400. DEACONESS HOSPITAL, CONCORD, MASS.
Edward F. Stevens, Architect

The first floor is occupied by offices, reception room, out-patients' clinic, ambulance entrance, and rooms, service and airing balcony for six patients. The ambulance entrance room and clinic opposite are made sufficiently large so that minor dressings may be done here, or even a slight operation in a septic case which one would not wish to take to the main operating room. The elevator and stairway to the second floor are near this entrance.

Though small, the operating department on the second floor is complete. There is the operating room, surgeons' scrub-up room, anæsthetizing room, and sterilizing room, with complete equipment. This department is in a wing on the north side of the building and is entirely shut off from the rest of the hospital.

On the main floor with the operating room are eight private rooms and a three-bed ward; also the necessary utility rooms. All rooms occupied by patients are located on the south and west. An airing balcony of sufficient size to accommodate all patients is placed on each story, on the southeast side of the building.

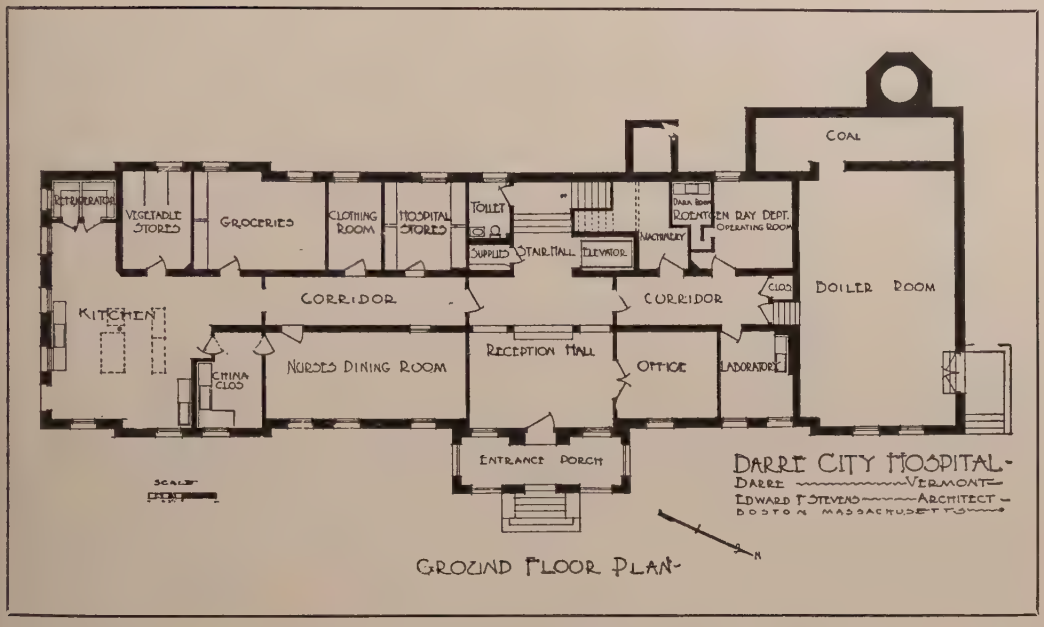



FIG. 401. BARRE CITY HOSPITAL, BARRE, VT.
Edward F. Stevens, Architect

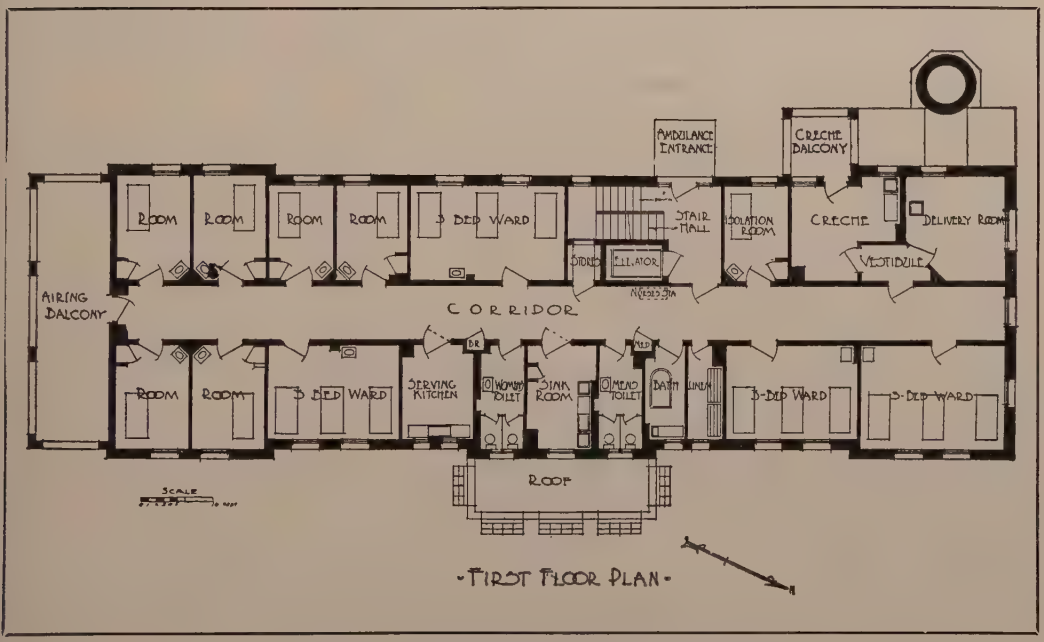



FIG. 402. BARRE CITY HOSPITAL, BARRE, VT.
Edward F. Stevens, Architect

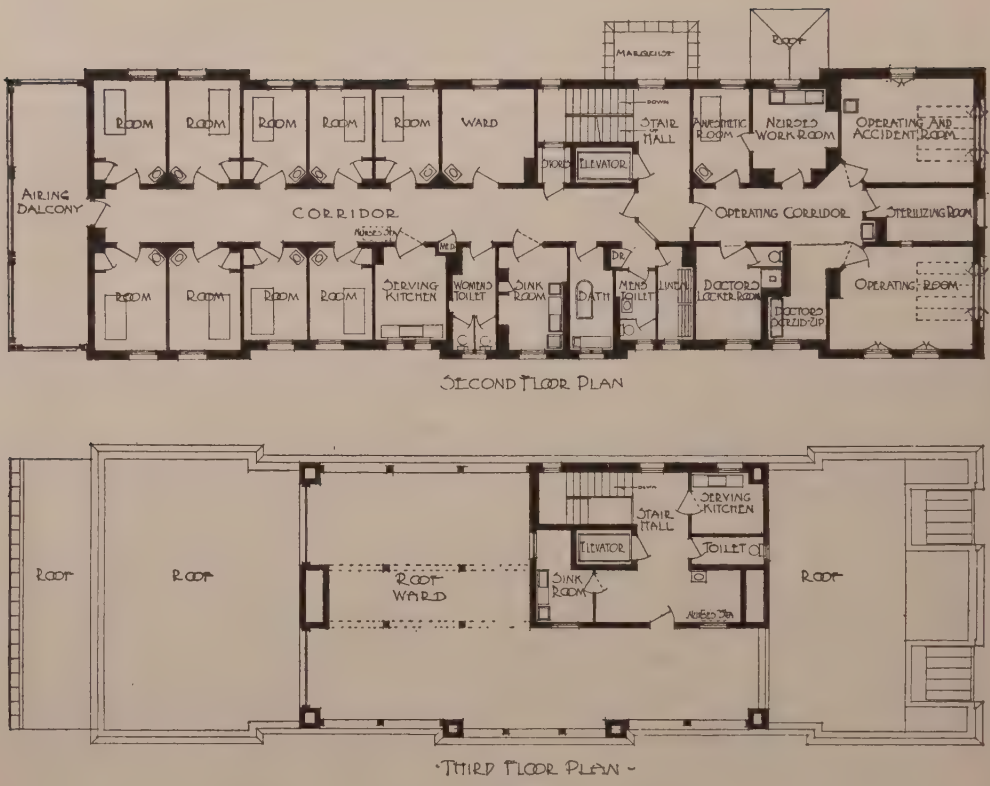



FIG. 403. BARRE CITY HOSPITAL, BARRE, VT.
Edward F. Stevens, Architect

The nurses are accommodated in a separate building nearby.

This is a complete hospital of seventeen beds, which cost less than twenty-five thousand dollars, with all modern details, ready for furnishing.

A unique problem presented itself in planning the little hospital for the NEW ENGLAND DEACONESS ASSOCIATION, in Concord, Massachusetts (Figs. 399-400). Only ten or twelve beds were wanted, but sufficient accommodation was demanded of the kitchen for summer tent work, and an additional private ward which was added two years later.

The site is almost ideal, being on a slight eminence, with a level plateau stretching to the south, pine trees at the back, and an extended view of river and hills.

The first floor of the original or north building constituted the hospital. The front is north, and, therefore, is taken up with the combination reception room and office, and with the utilities. In the eastern extension, shut off from the main hospital, is the operating suite,

FIG. 404. BARRE CITY HOSPITAL, BARRE, VT.
Edward F. Stevens, Architect

consisting of operating room, sterilizing room, anæsthetizing room, and surgeons' scrub-up room. The south and west sides are devoted to the rooms of patients. An airing balcony extends the entire width of the south front, and every ward and private room opens directly upon the balcony. There is an incline from the balcony to the ground so that patients may be wheeled down; easy service to the tent wards is thus secured. There were two private rooms, now used as reception rooms, a two-bed ward, a three-bed ward, and a four-bed ward.

The basement is devoted to domestic purposes, with kitchen, nurses' dining-room, storage for supplies, heating plant, and a small hand laundry.

The second story, in the gambrel roof, provides sleeping accommodations for the superintendent, four nurses, and three servants, all in single rooms, with a pleasant sitting-room at the west.

As high pressure steam or gas was not available here, electricity was employed for the diet kitchen and for sterilizing.

The original hospital building is fireproof and cost, ready for occupancy, less than twenty thousand dollars.

The small private pavilion, accommodating eight private patients, relieves the original building and affords room for the increasing demand.

The second story of the new wing, also fireproof, occupied tem-

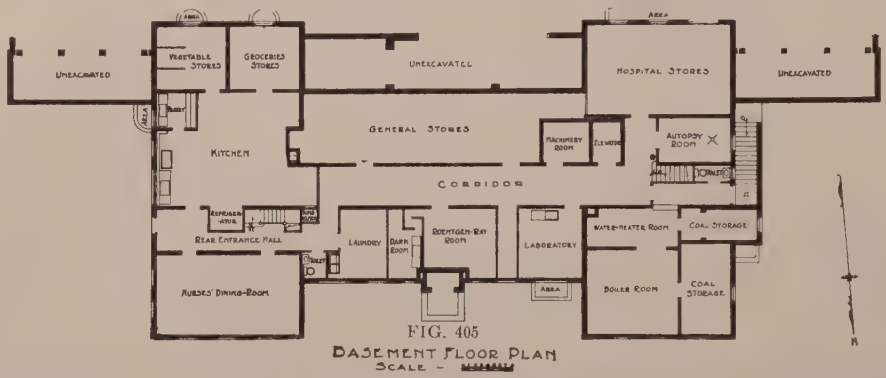
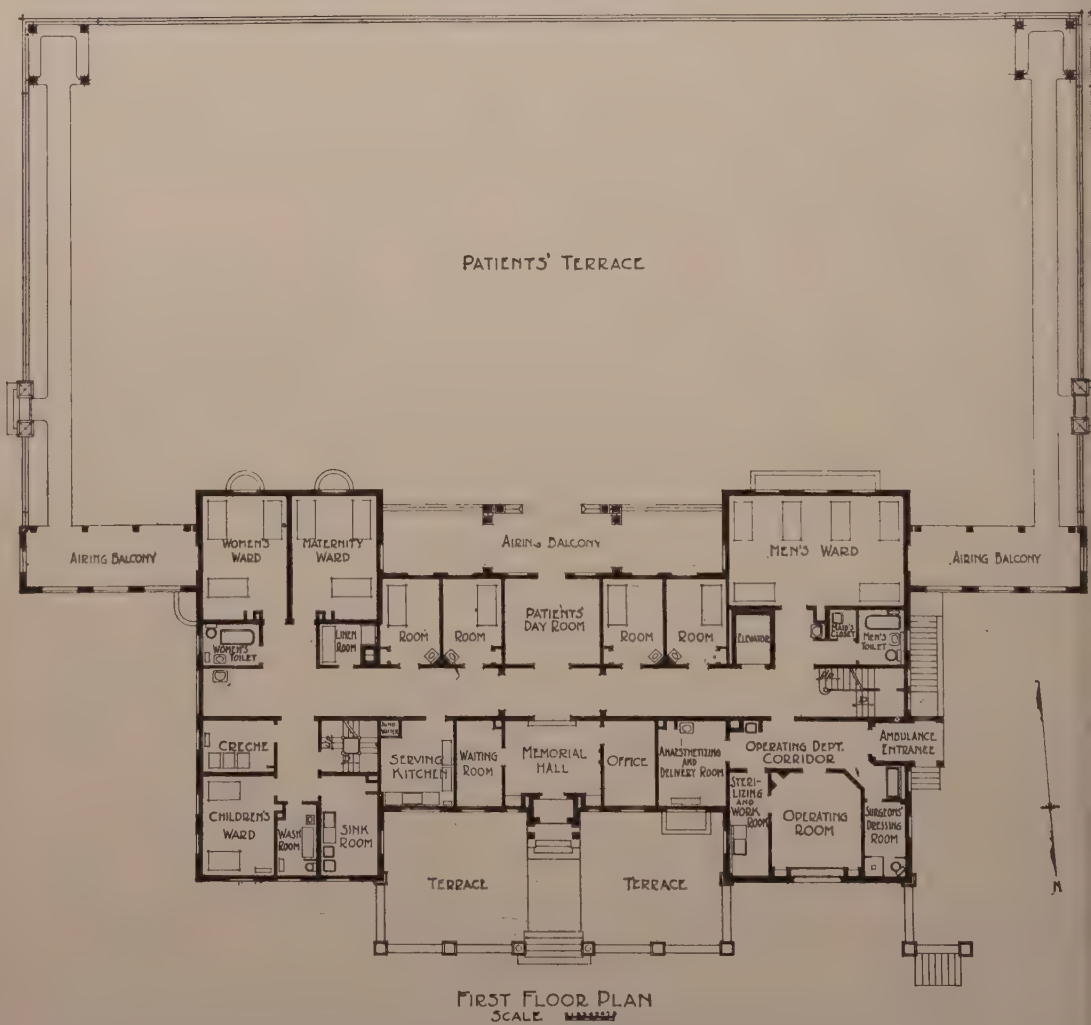



FIG. 405

BASEMENT FLOOR PLAN

SCALE –




FIRST FLOOR PLAN

SCALE

FIG. 406. BENJAMIN STICKNEY CABLE MEMORIAL HOSPITAL, IPSWICH, MASS.
Edward F. Stevens, Architect

porarily by nurses, is so constructed that with slight alterations the private service can be increased to sixteen beds.

A small city hospital, where the ground is more or less restricted, certainly should consider only fireproof structure.

The Barre (Vermont) City Hospital (Figs. 401-404) is another solution of the small hospital problem. Located on one of the hills overlooking the city and taking advantage of the southeasterly slope for sunlight and air, the simple brick building with its broad brick porch bids welcome to the visitor or patient.

On the entrance level or ground floor are located the administration, the heating and kitchen departments, as well as the Roentgen-

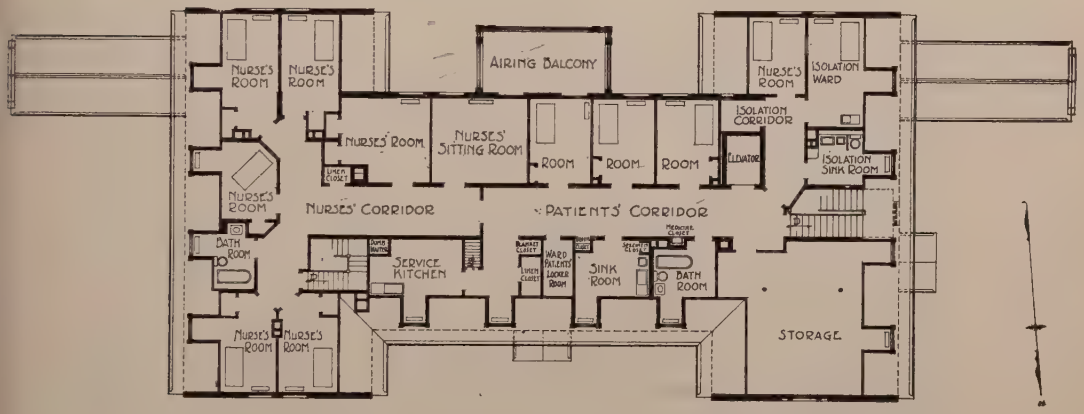



FIG. 407. SECOND FLOOR PLAN, BENJAMIN STICKNEY CABLE MEMORIAL HOSPITAL, IPSWICH, MASS.

ray and laboratory departments; and, with the easterly side wholly above ground, light and air are not sacrificed.

The grade permits entrance to the first floor on the westerly side, where the ambulance door is located.

With all the general offices and utilities placed on the ground floor, the first and second floors are left free for the care of patients.

In planning this hospital no large wards were provided, for it was felt that a better segregation could be obtained with smaller wards. On the first floor were located four three-bed wards, seven single wards, and a small maternity department, entirely isolated, with delivery room, crèche, and bathing department.

The second floor is almost wholly devoted to private patients and consists of one four-bed children's ward and nine private wards. A complete operating department is also provided on this floor, composed of two operating rooms, anæsthetic room, nurses' work room,

FIG. 408. BENJAMIN STICKNEY CABLE MEMORIAL HOSPITAL, IPSWICH, MASS.
Edward F. Stevens, Architect

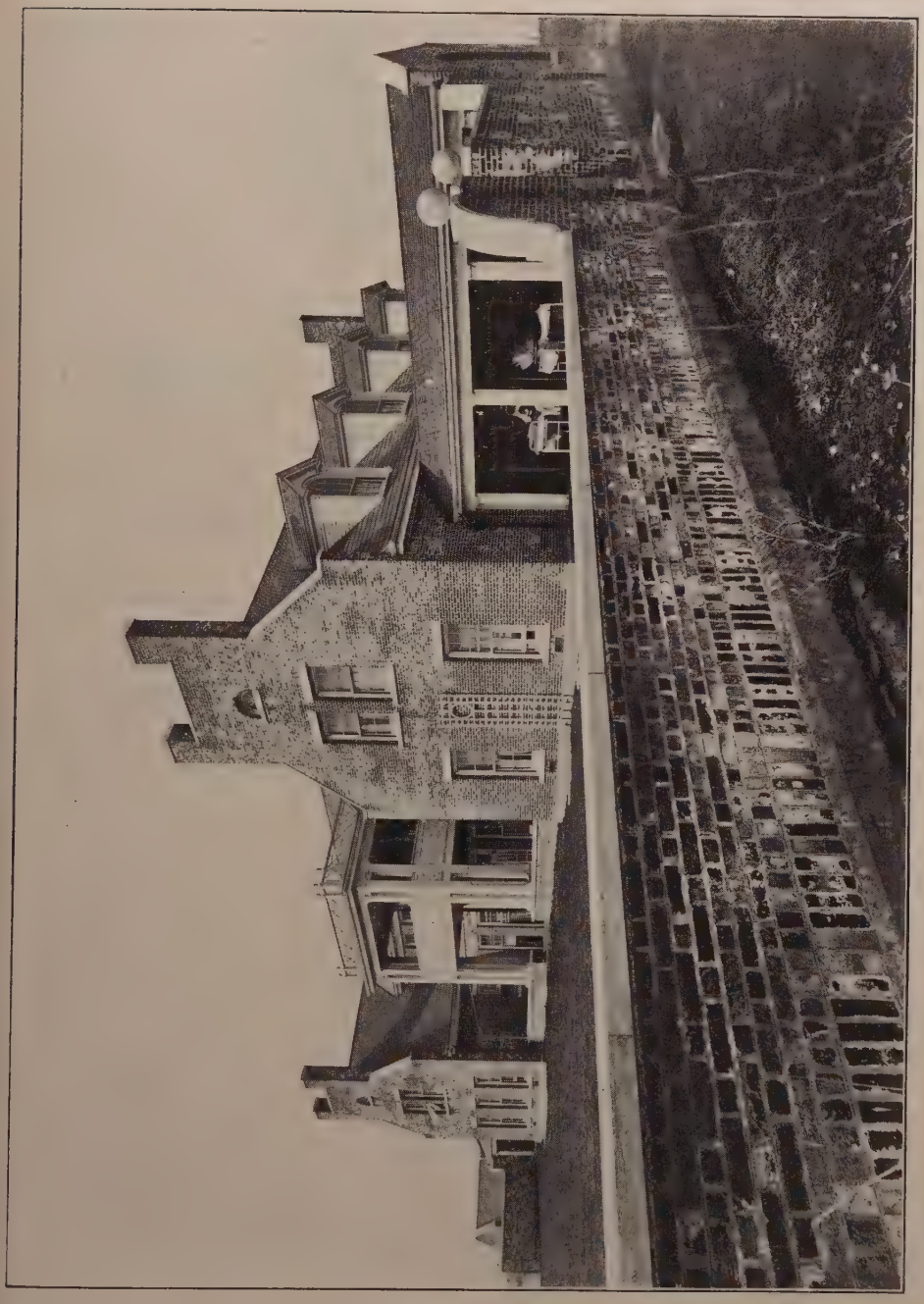


FIG. 409. BENJAMIN STICKNEY CABLE MEMORIAL HOSPITAL, IPSWICH, MASS.
SOUTH BALCONIES.
Edward F. Stevens, Architect

FIG. 410

sterilizing room and surgeons' locker rooms, all shut off from the patients' quarters and planned for the most efficient service.

On each floor ample serving kitchens, sink rooms, bath and toilet rooms, linen storage closets, medicine closets, and nurses' stations are provided.

Large airing balconies at the south afford opportunities for patients to be wheeled into the open air. All doors are wide enough for beds, and all beds are provided with trucks, while the elevator connects all floors.

Perhaps the most interesting feature of this thirty-two-bed hospital is the extensive roof ward, equipped with all the conveniences

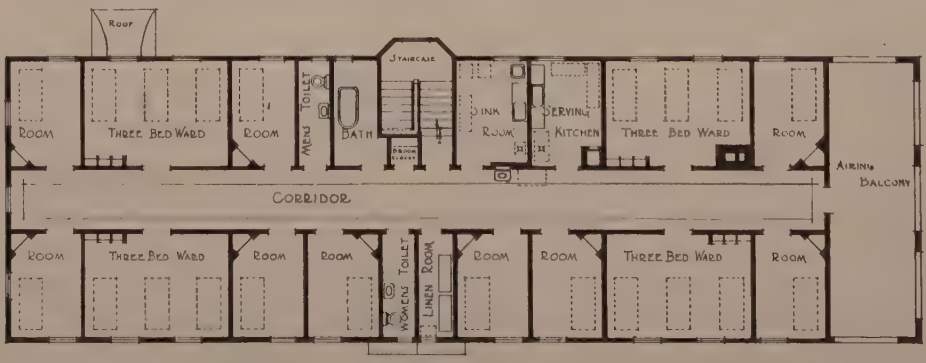
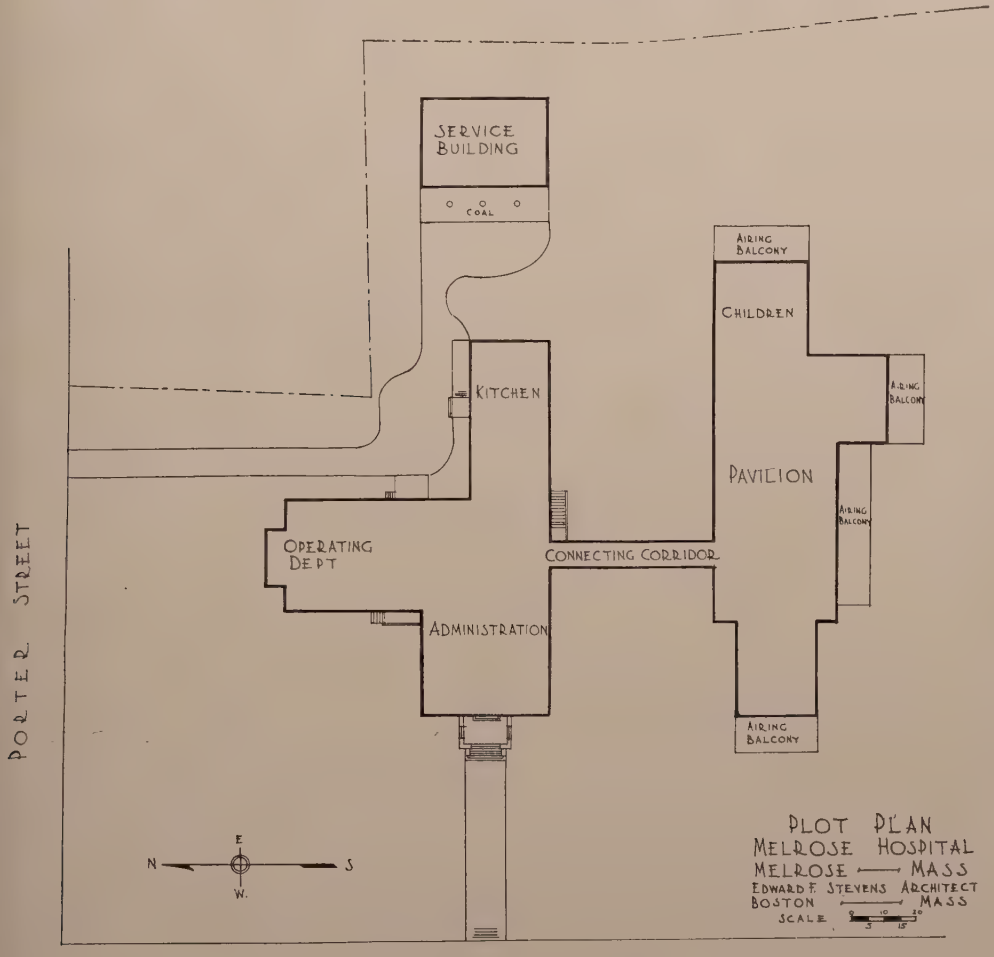



FIG. 411

and accessories of indoor wards and commanding a wonderful view over the city and the adjoining hills.

The materials of construction are common brick, granite and terra cotta, with floor construction of iron and concrete; the interior walls of hollow tile; the finished flooring is of terrazzo, cement, and linoleum; the finish is simple, the windows wide, and the coloring of the inside cheerful and attractive. The equipment is simple, but fulfills every requirement of modern science.

Differing from the last example, where the grounds were more or less restricted, the BENJAMIN STICKNEY CABLE MEMORIAL HOSPITAL (Figs. 405-409), in Ipswich, Massachusetts, is erected in the center




LEBANON STREET

FIG. 412

of a ten-acre lot. (See Chapter XXI on landscape architecture.) The ample space around the building, coupled with the natural beauty of the site, gives the architect more than usual opportunities for placing the rooms to the best advantage.

The building faces the north, or toward the town proper, but practically all the rooms for patients are on the south, overlooking the beautiful valleys and hills in that direction.

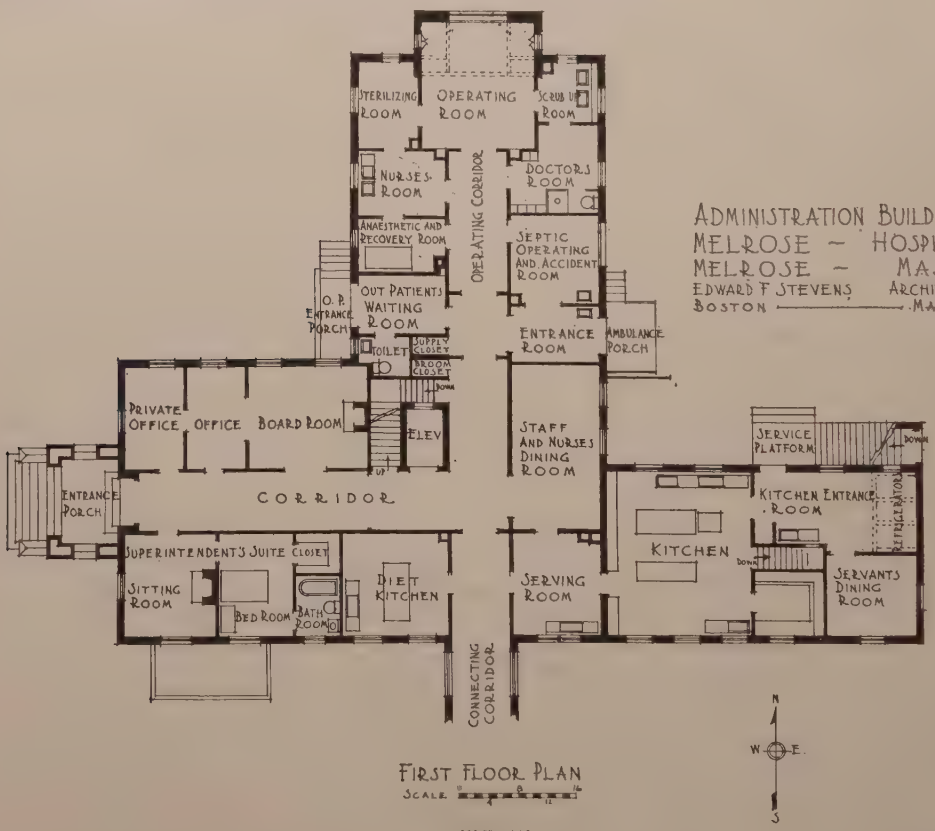



FIG. 413

The building, of fireproof materials, is designed in the early Georgian style so common in the old New England towns. It accommodates twenty patients on the first floor, and the second floor is also available for use of patients.

The ground floor contains the kitchen, dining-rooms, X-ray, morgue, heating, and storage rooms; for the present, the second story is set apart for nurses and for a small isolation department.

To give assurance of security, a low brick wall is built around the patients' court, upon which three airing balconies open. These airing

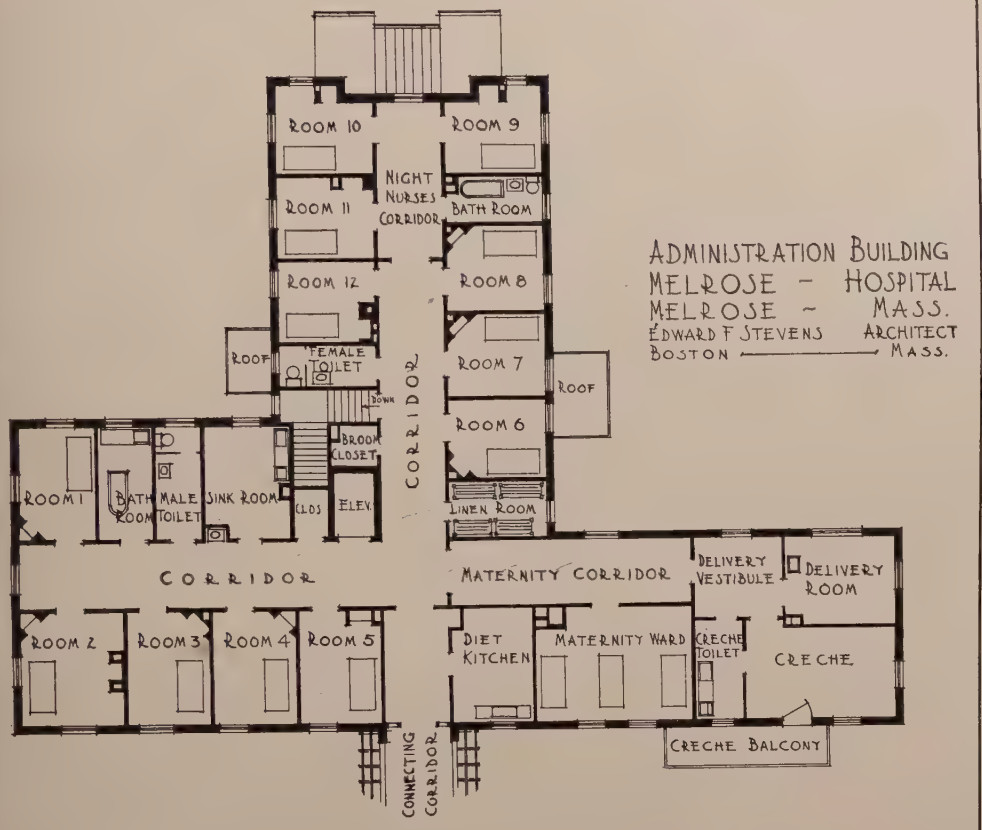



FIG. 414

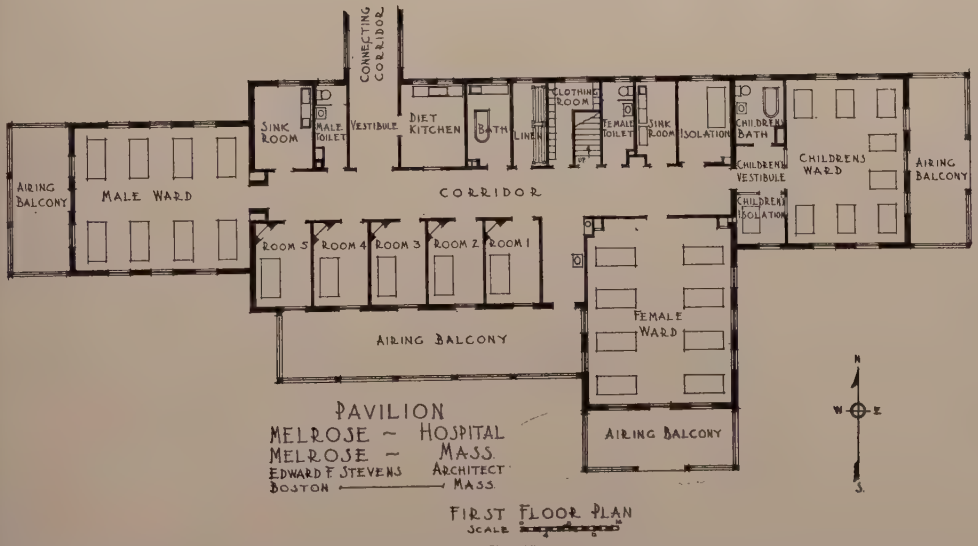



FIG. 415

balconies, projecting to the east and west, cut off the cold winds from the north and east.

The plan is simple: one enters through the memorial entrance, which is finished in Colonial detail, passes up two steps to the main corridor and thence into the private patients' day room, or out into the patients' court (Figs. 26 and 38).

On the east end of the building is located the men's ward, the operating department, and the ambulance entrance; on the west, the

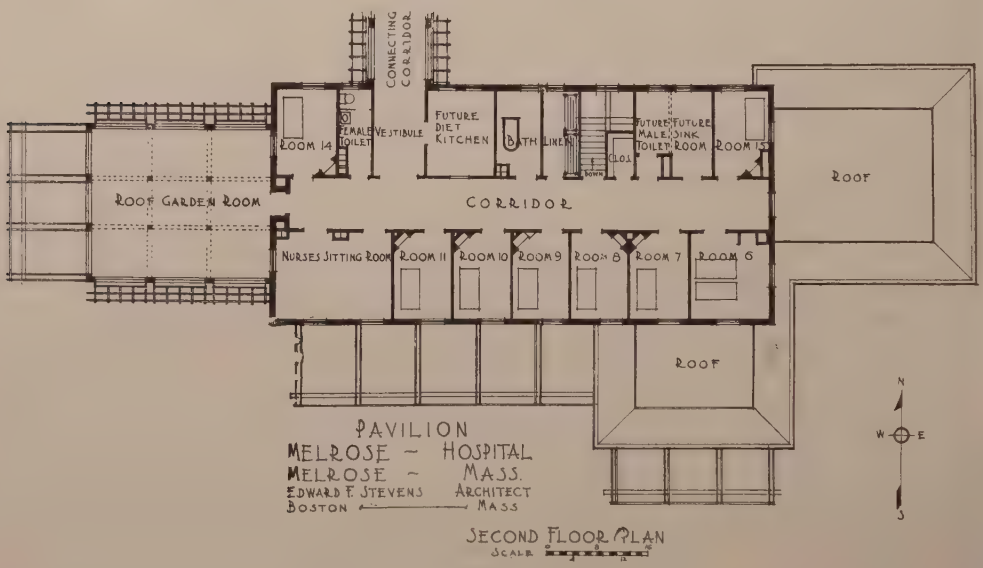



FIG. 416

women's and maternity wards; on the northeast, the children's ward; on the south are four private rooms; and on the north the utilities.

The small Greenville Hospital (Figs. 410, 411), at Greenville, Maine, built to meet the needs of the lumber industries of the vicinity, at the figure, approximately, of twenty-five thousand dollars, is, perhaps, as complete as any hospital of a like cost. It is somewhat unduly expensive, but was built in the season of 1916-1917 when all materials were at a maximum.

The problem of the Melrose Hospital (Figs. 412-419) at Melrose, Massachusetts, was to build a fifty- to sixty-bed hospital on a noisy street corner, with trolley lines on two streets.

The buildings were set well back from the street, the operating portion only being near the street, the buildings being so planned as to bring the patients away from the noisy corner. There are three buildings in this group.

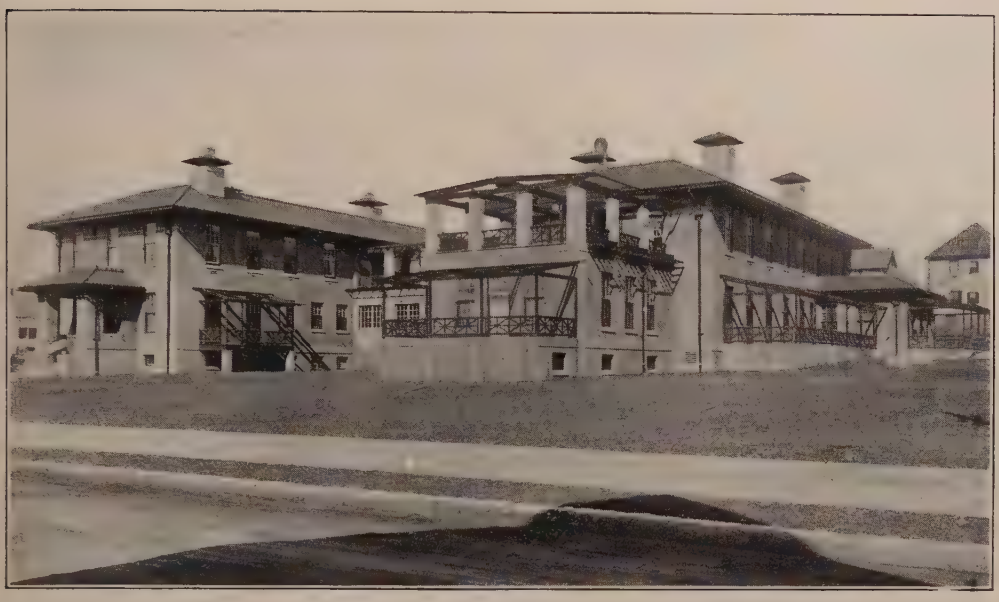


FIG. 417. MELROSE HOSPITAL, MELROSE, MASS.

FIG. 418. OPEN AIR CORRIDOR, MELROSE HOSPITAL, MELROSE, MASS.
Edward F. Stevens, Architect

FIG. 419. PRIVATE ROOM, MELROSE HOSPITAL, MELROSE, MASS.

In the basement of the administration building are the Roentgen-ray and laboratory departments, the pharmacy, store rooms, autopsy and lecture rooms, and rooms for male help. On the first floor are all of the administrative offices, the superintendent's suite, and the operating department.

The second floor, however, is devoted to the care of patients—1st, in private rooms and suites; and 2d, in the maternity department, which consists of a three-bed ward, a delivery room, creche, and wash room—all isolated from the other portions of the hospital.

One serving kitchen serves all patients in this building.

The ward pavilion is joined to the administration building by a well-lighted corridor. On the first floor are the three main wards—men's, women's and children's—and five private rooms, and on the second floor are ten private rooms, with the usual service.

All of the wards and private rooms on the first floor open directly onto airing balconies, which are so separated that the patients on one balcony are not visible to those on another.

On the second story a large roof ward has been provided for the treatment of pneumonia cases, as well as for use by ambulatory cases.

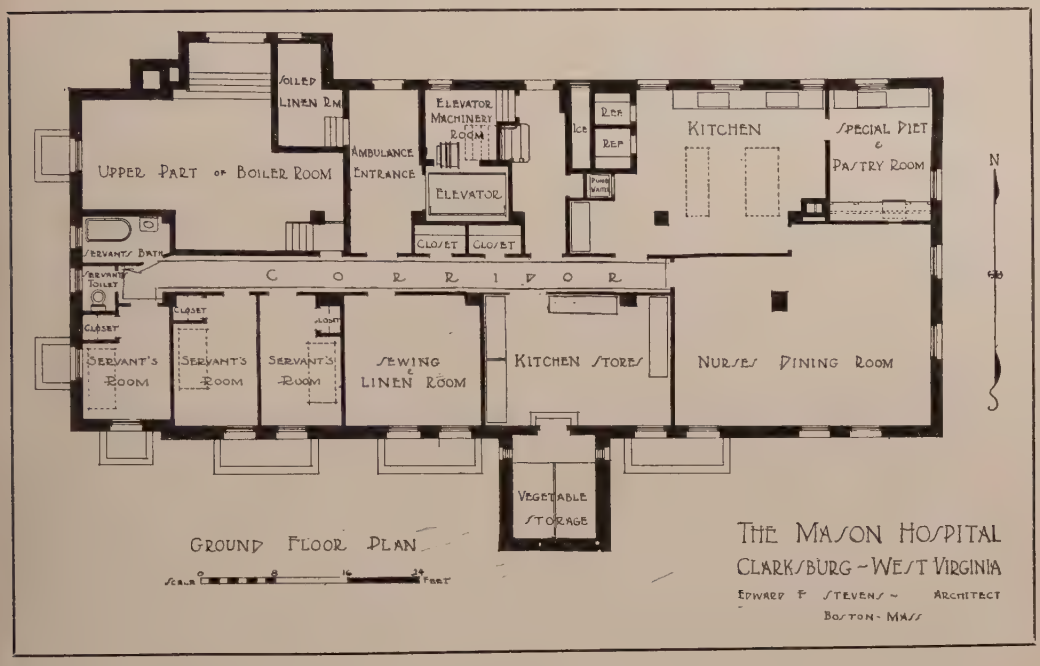



FIG. 420

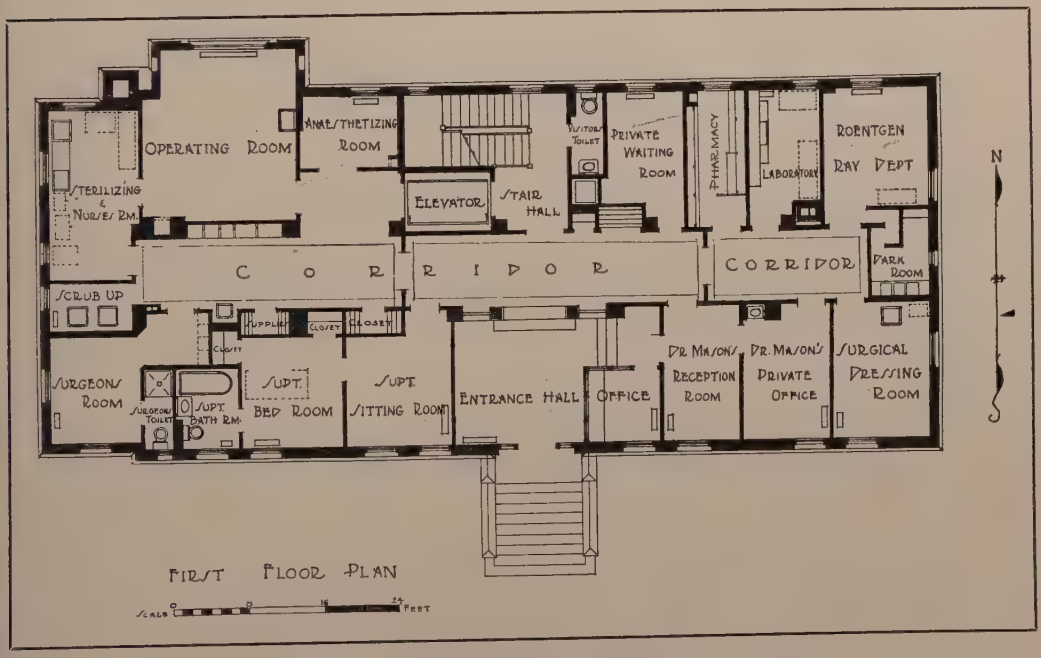



FIG. 421. MASON HOSPITAL, CLARKSBURG, W. VA.
Edward F. Stevens, Architect

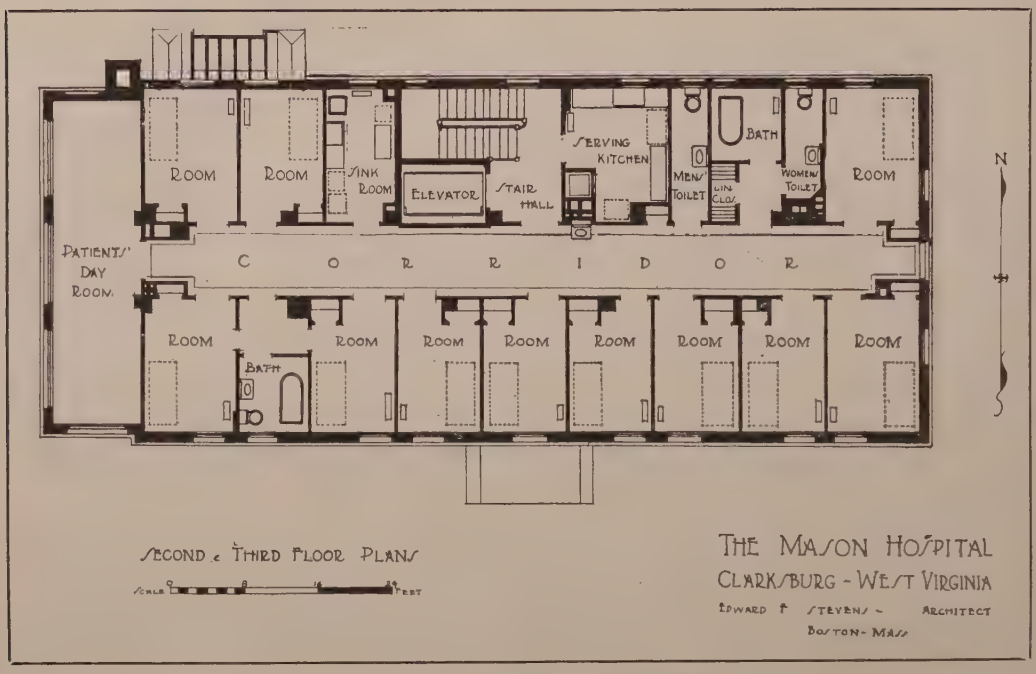



FIG. 422

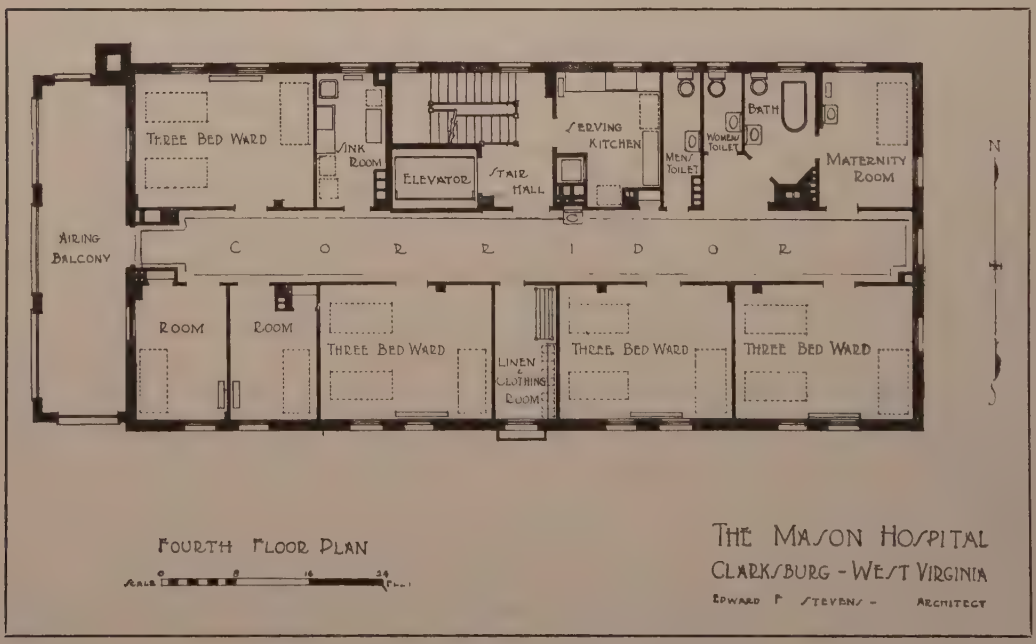



FIG. 423. MASON HOSPITAL, CLARKSBURG, W. VA.
Edward F. Stevens, Architect

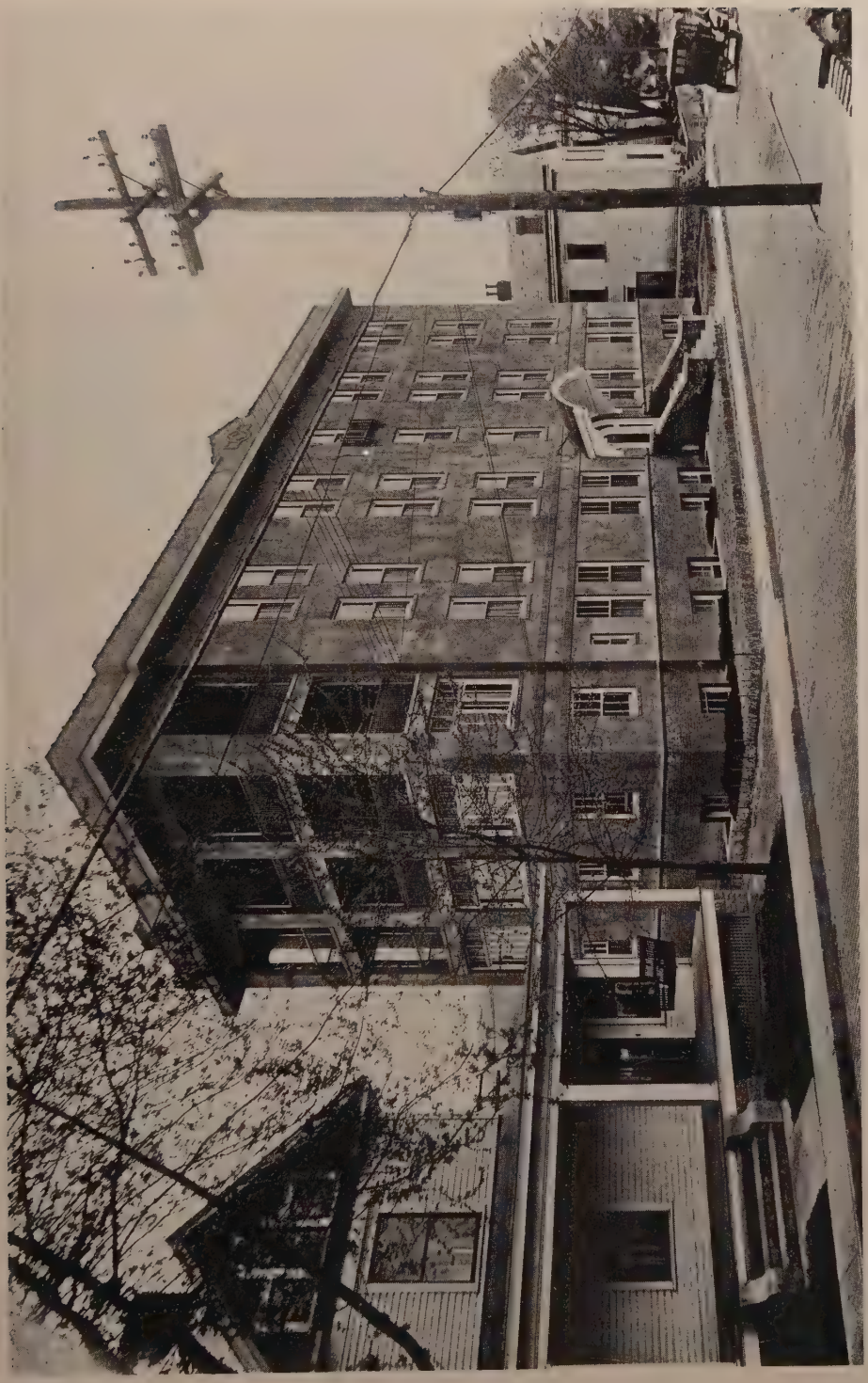


FIG. 424. THE MASON HOSPITAL, CLARKSBURG, W. VA.

FIG. 425. GROUND FLOOR

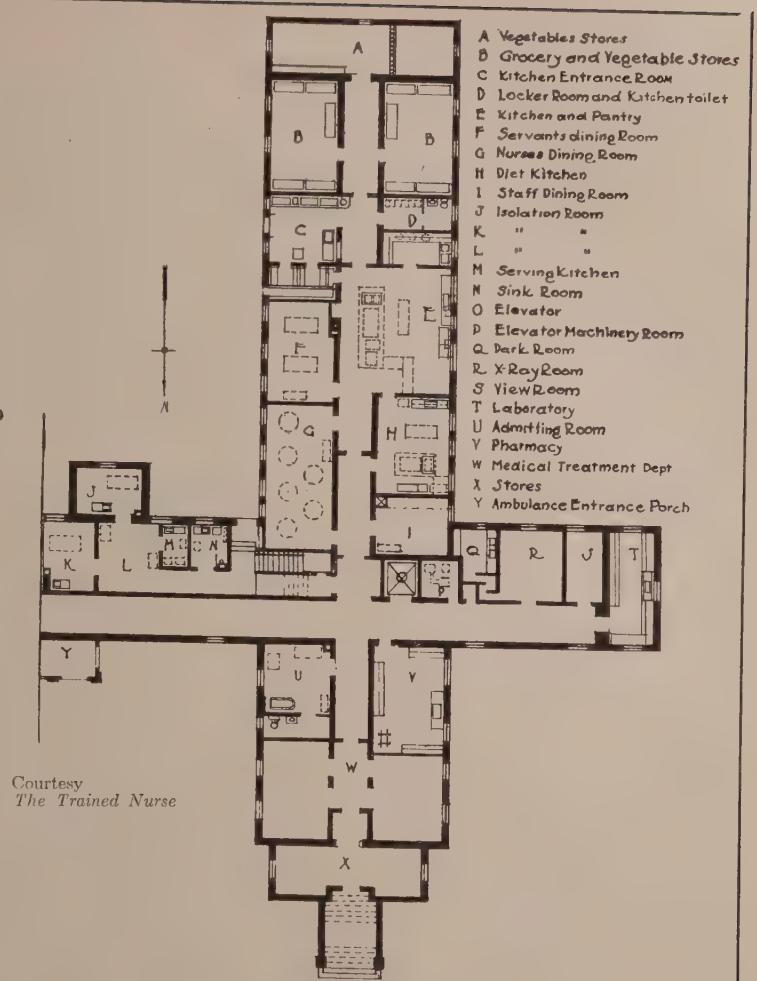



FIG. 426. FIRST FLOOR

PLANS, GOOD SAMARITAN HOSPITAL, SANDUSKY, O.
Edward F. Stevens, Architect

The heating plant and laundry are housed in a separate building, which also affords sleeping accommodations for female servants. The nurses are provided for in an adjoining estate.

As in the case of Dr. Williams' Sanatorium at Macon, the MASON HOSPITAL (Figs. 420, 421), at Clarksburg, West Virginia, was mainly for the private practice of the founder.

The hospital is built on a somewhat restricted site.

The plans are self-explanatory. Provision is made for a rather extensive out-patient department in connection with the X-ray and laboratory. The operating department is set apart from the administration, and is reached either from the ambulance entrance at the rear or through the main entrance at the front.

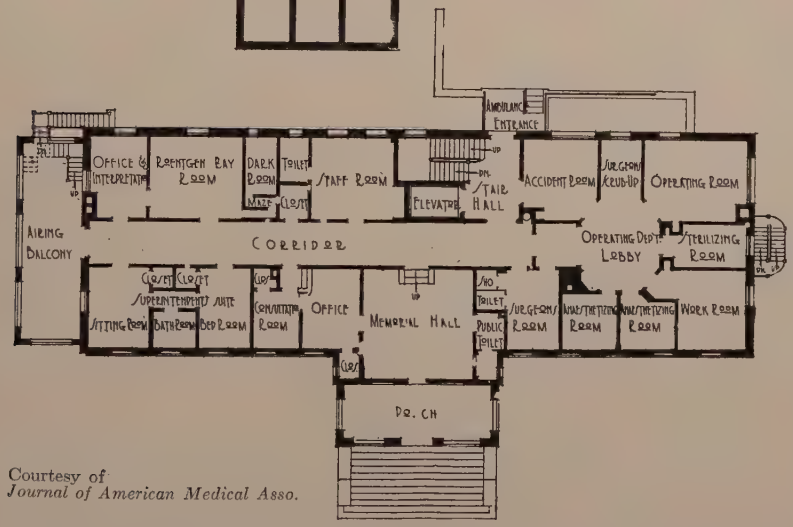
FIG. 427. SECOND FLOOR, GOOD SAMARITAN HOSPITAL, SANDUSKY, O.

FIG. 428. SOLDIERS' & SAILORS' MEMORIAL HOSPITAL, PENN YAN, N. Y.
Stevens & Lee, Architects

This small fireproof hospital is self-contained, housing all departments except the nurses.

The Good Samaritan Hospital, Sandusky, Ohio (Figs. 425, 426, 427), is a very complete small hospital. On the ground floor are the laboratory, X-ray, medical treatment rooms, isolation rooms, kitchen and dining-rooms. On the first floor is the administration department, well separated from the wards for men, women and children. On the second floor are the operating rooms, grouped about a rotunda, a small maternity department, and sixteen private rooms. Good balconies are provided for each floor.

FIG. 429. GROUND FLOOR, SOLDIERS' AND SAILORS' MEMORIAL HOSPITAL, PENN YAN, N. Y.




Courtesy of
*Journal of American Medical Asso.*

FIG. 430. FIRST FLOOR, SOLDIERS' AND SAILORS' MEMORIAL HOSPITAL, PENN YAN, N. Y.

No more fitting memorial could be erected to the men who fought in the world war than a hospital building. The public-spirited citizens of Penn Yan, New York, chose this form of expression for their gratitude. The Soldiers' and Sailors' Memorial Hospital (Fig. 428-432), set in a beautiful park, has for its entrance a memorial hall. Its walls have bronze tablets set into the paneling, bearing the names of 650 soldiers and marines who served in the war. There are cabinets for war relics, etc.

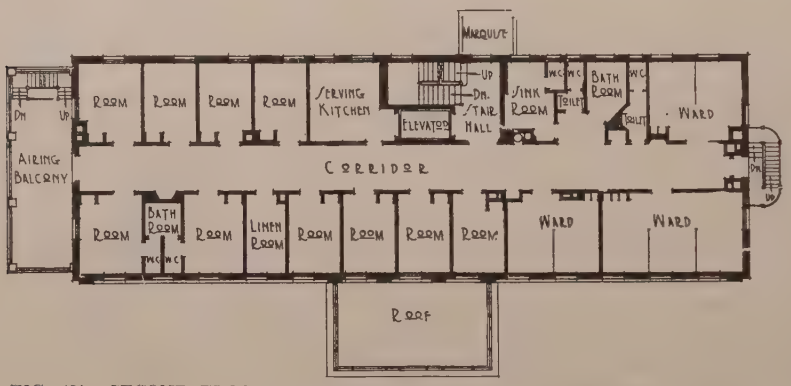
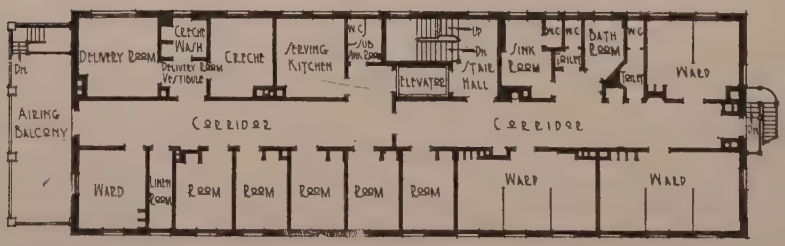



FIG. 431. SECOND FLOOR, SOLDIERS' AND SAILORS' MEMORIAL HOSPITAL, PENN YAN, N. Y.




Courtesy of *Journal of American Medical Asso.*

FIG. 432. THIRD FLOOR, SOLDIERS' AND SAILORS' MEMORIAL HOSPITAL, PENN YAN, N. Y.

The office, consultation rooms and staff room are near the entrance, with the superintendent's suite and a small X-ray department adjoining. To the right is a complete operating department, with its entrance to the elevator away from the front hall, and an accident room near the ambulance entrance.

The second floor contains private and semi-private rooms with central utilities and an airing balcony. The third floor has a maternity department shut off from other patients, who are in small wards, the delivery room and creche being still further isolated by two doors.

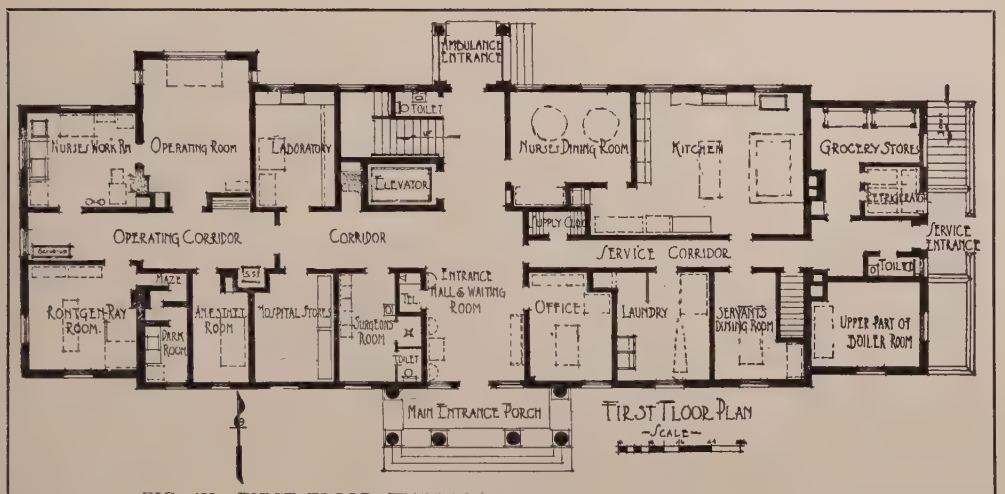



FIG. 433. FIRST FLOOR, WALLACE THOMSON HOSPITAL, UNION, S. C.

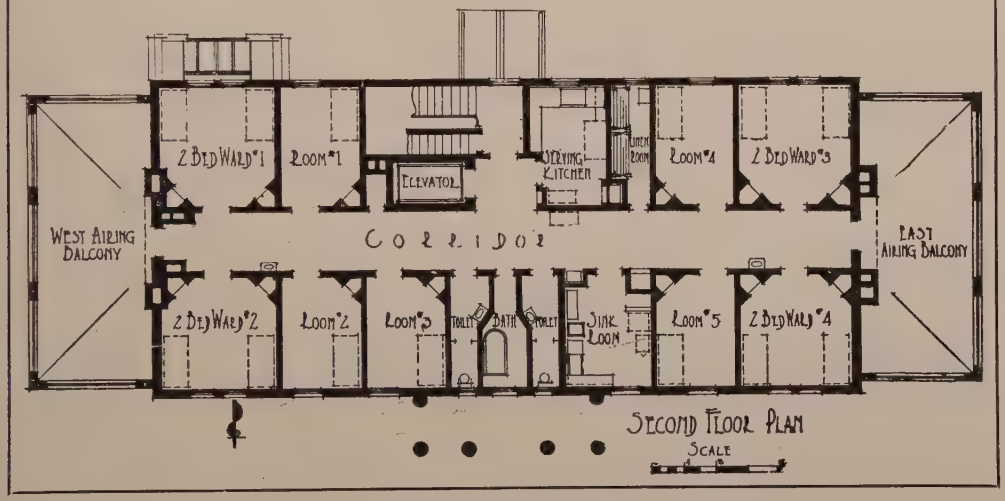



FIG. 434. SECOND FLOOR, WALLACE THOMSON HOSPITAL, UNION, S. C.
Stevens & Lee, Architects

The elevator opens at one end into the serving kitchen, and at the other into the main stair hall.

The WALLACE THOMSON HOSPITAL, Union, South Carolina (Figs. 433-435), is on a commanding site, sunny, away from business and traffic. The exterior is in southern colonial style, of red brick, with white trimmings and a red tile roof. The first floor is devoted to the administrative and surgical departments, the second being reserved for patients. The operating and X-ray departments are quite complete; the staff room is used as a surgeons' dressing room. The kitchen, dining-rooms, laundry, etc., are shut off from the entrance

FIG. 435. WALLACE THOMSON HOSPITAL, UNION, S. C.
Stevens & Lee, Architects

and the office. The ambulance entrance is close to the elevator and staircase. On the second floor are two-bed wards, private rooms, central utilities, and good balconies. The placing of parts with relation to each other in so small a building is an interesting study.

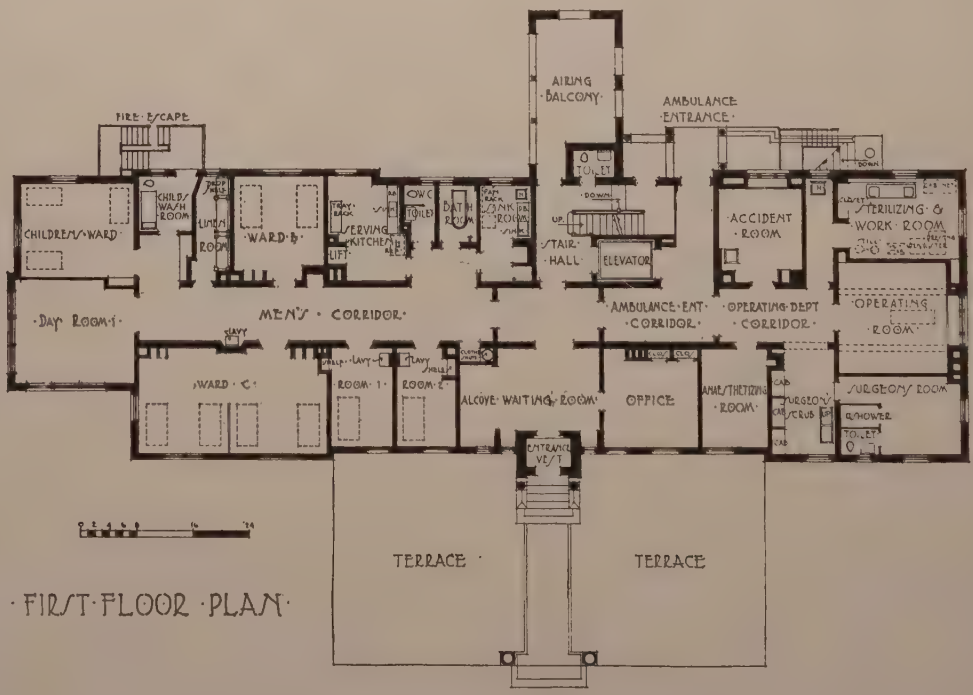
The Mary Lane Hospital, Ware, Massachusetts (Figs. 436-439), provides thirty beds for a small town and the surrounding community. It has complete hospital facilities for men, women, children, and maternity, with operating room, accident and delivery rooms, laboratory and X-ray. The plan endeavors to concentrate work, and

FIG. 436. MARY LANE HOSPITAL, WARE, MASS.
Stevens & Lee, Architects

yet shut off disturbing noises from other departments. Electricity is used for sterilizing and distilling water in the operating room, as there is no high-pressure steam. The color scheme and furnishings are designed to produce a restful and homelike atmosphere.

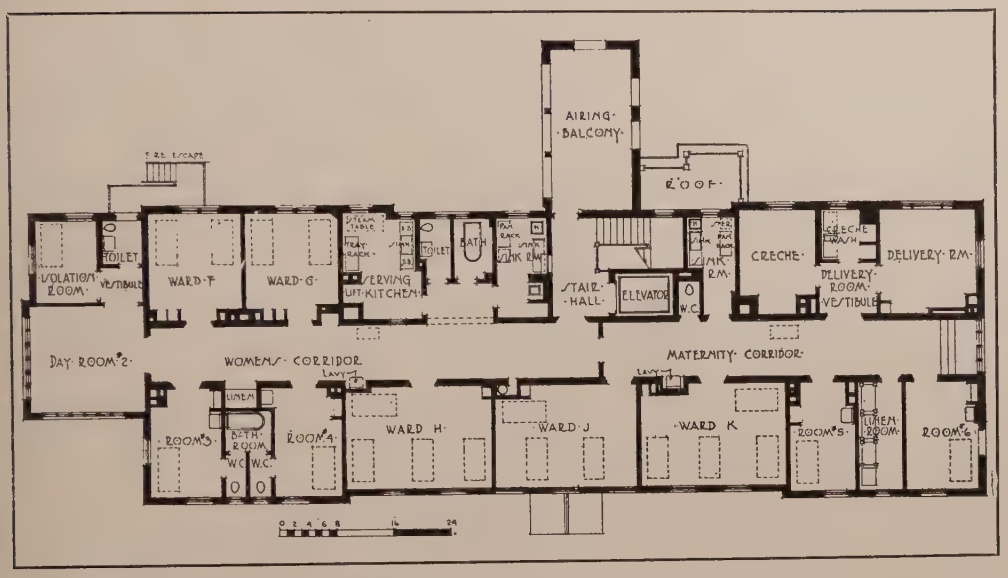
The Presque Isle General Hospital, Presque Isle, Maine (Figs. 440-443), presents a very simple plan for caring for thirty-two patients. It is a straight, rectangular building, economical in space and cost, self-contained, including laundry, with wards on the first floor, private rooms on the second, and maternity and operating room on the third. The nurses' station and utilities are centralized, the

FIG. 437. GROUND FLOOR, MARY LANE HOSPITAL, WARE, MASS.




Courtesy of *Journal of American Medical Asso.*

FIG. 438. FIRST FLOOR, MARY LANE HOSPITAL, WARE, MASS.




Courtesy of *Journal of American Medical Asso.*

FIG. 439. SECOND FLOOR, MARY LANE HOSPITAL, WARE, MASS.

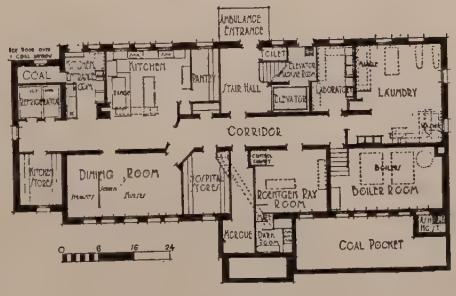



FIG. 440. Ground Floor

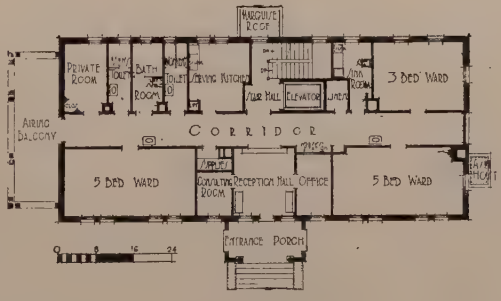



FIG. 441. First Floor

Courtesy of *Journal of American Medical Asso.*

PRESQUE ISLE GENERAL HOSPITAL, PRESQUE ISLE, MAINE

elevator and stairs are shut off from the main corridor. Each floor has good airing balconies.

A very excellent small hospital plan is the one which was awarded first prize in a competition conducted by *The Modern Hospital,* one of the leading hospital journals, the committee of award being composed of architects and hospital administrators. It is a self-contained building for forty-five patients, and includes kitchen, laundry, X-ray, out-patient department, operating and accident rooms, wards and private rooms for men, women and children, also maternity cases. It is carefully planned in all details (Figs. 444-447).

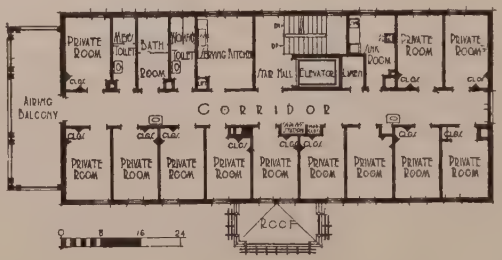



FIG. 442. Second Floor

Courtesy of *Journal of American Medical Asso.*

FIG. 443. Third Floor

PRESQUE ISLE GENERAL HOSPITAL, PRESQUE ISLE, MAINE

An interesting one-story hospital is the San Antonio Community Hospital, at Upland, California (Fig. 448). It is built upon the principle of the adobe house, with thick walls, hollow; within the thickness of the foundation all pipes are placed. It is built directly on the ground, an economy suited only to a mild climate. It is complete as it stands, but designed for future enlargement.

Another one-story hospital, similar in construction, but more elaborate in plan, is the Riverside Community Hospital, Riverside, California (Fig. 449). It has a unique feature in its provision for an osteopathic department.

Courtesy of *Modern Hospital*

PERSPECTIVE - VIEW
NORTH AND EAST ELEVATIONS

FIG. 444. PRIZE PLAN FOR SMALL HOSPITAL

LEGEND

1. Reception Room
2. Drug Room
2A. Alcohol Storage
3. Office and Clinical Record Room
4. Private Office
5. Consultation Room
6. Store Closet
7. Locker & Dressing Rm. Graduate Nurses
8. Male Help
9. General Storage
10. Coal
11. Boiler Room
12. Kitchen Storage
13. Grocery Storage
14. Cold Storage
15. Kitchen Helps' Lockers & Toilet Room
16. Kitchen Porch
17. Kitchen
18. Elevator
19. Scullery
20. Diet Kitchen
21. Helps' Dining Room
22. Female Help
23. Clean Linen
24. Laundry
24A. Clothes Chute
25. Nurses' Dining Room
26. Staff Dining Room
27. Treatment Room—Out-patients
28. Waiting Room

Courtesy of *Modern Hospital*

FIG. 445. GROUND FLOOR, PRIZE PLAN FOR SMALL HOSPITAL
Butler & Rodman, Architects

LEGEND

1. Veranda Ward Patients
2. Clothes Chute
3. 4-Bed Ward
4. Janitor's Closet
5. Chart Room, Nurses' Toilet, Medicine Cabinet
6. Pantry and Dumbwaiter
7. Linen Closet
8. Elevator
9. Stair Hall
10. Supply Closet
11. Utility Room
12. Womens' Toilet
13. Ward Bathroom
14. Mens' Toilet
15. Recovery Room
16. Children's Bath
17. Children's 4-Bed Ward
17A. Toy and Store Closets
18. Children's Veranda
19. Laboratory
20. X-Ray Room
20A. Dressing Room
20B. Dark Room
20C. Plate Storage
21. Ambulance Platform
22. Accident Receiving and Surgical Dressing Room
23. Doctor's Dressing Room
24. Doctor's Scrub-up Room
25. Major Operating Room
26. Sterilizing Room
27. Minor Operating Room
28. Anesthesia Room.
29. Nurse's Toilet and Locker Room
30. Nurse's Work-room
31. Store Closet
32. Birth Room
33. Vestibule.
34. Nursery.
35. Incubator
36. 2-Bed Maternity Ward
37. Maternity Bath

FIG. 446. FIRST FLOOR, PRIZE PLAN FOR SMALL HOSPITAL

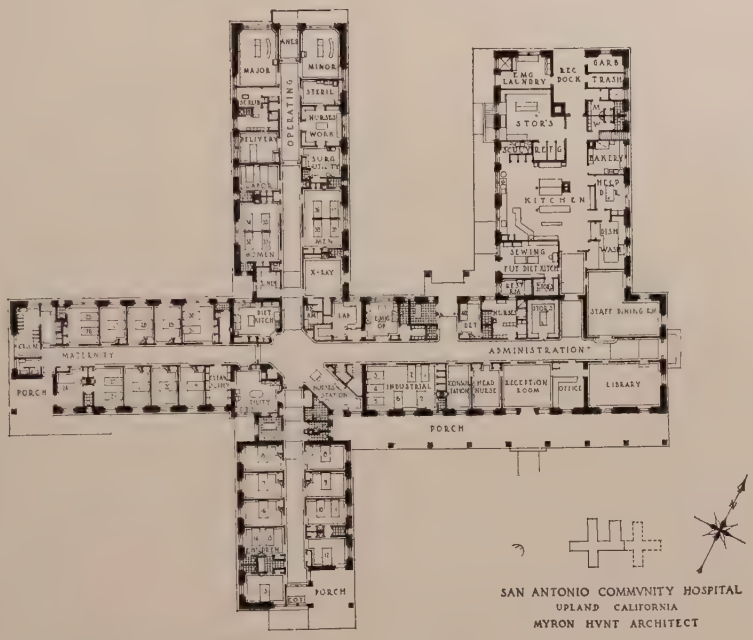
LEGEND

1. Veranda Private Patients
2. Clothes Chute
3. Private Room
4. Janitor's Closet
5. Chart Room, Nurse's Toilet, Medicine Cabinet
6. Pantry with Dumbwaiter
7. Linen Closet
8. Elevator
9. Stair Hall
10. Supply Closet
11. Utility Room
12. 2-Bed Semi-Private Ward
13. Men's Toilet
14. Women's Toilet
15. Resident Physician
15A. Resident Physician's Bath
16. Store Room
17. Superintendent's Room
17A. Superintendent's Bath
18. Patient's Bath

Courtesy of *Modern Hospital*

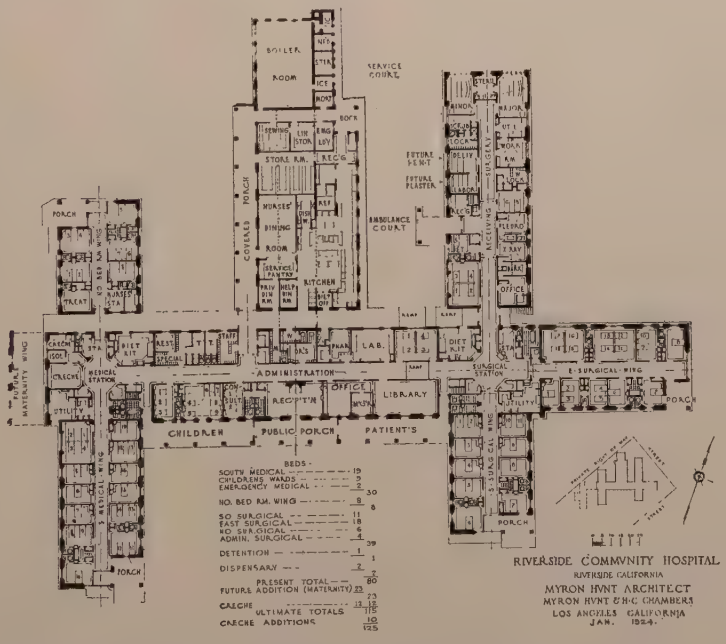
FIG. 447. SECOND FLOOR, PRIZE PLAN FOR SMALL HOSPITAL

Butler & Rodman, Architects




Courtesy of *Modern Hospital*

FIG. 448. SAN ANTONIO COMMUNITY HOSPITAL, UPLAND, CALIF.




Courtesy *Modern Hospital*

FIG. 449. RIVERSIDE COMMUNITY HOSPITAL, RIVERSIDE, CALIF.

# CHAPTER XV

## THE MEDICAL SCHOOL HOSPITAL

SO strongly is the medical school allied to the hospital that in many medical centres it is considered desirable to either build as a part of the medical school a hospital of considerable size, or form an alliance with an existing hospital organization in such a way as to connect directly with the hospital building, while in other cases the officiating hospital may be at some distance from the medical school.

The clinical material available at all times through the close proximity of the medical school with the hospital and the professional aid to be secured from the medical school makes this combination very desirable.

The problem of the ideal connection of the two institutions and subdivisions of each it is well to discuss to some length and to show various solutions.

Prior to the beginning of this century only in rare instances did a medical school function in direct connection with any hospital in this country.

In a majority of cases the medical school is a department of some university, where its buildings may or may not be in close proximity to the major academic and scientific departments.

It is the writer's feeling that notwithstanding the fact that the patient in the medical school hospital may reasonably be clinical material, the same careful planning should exist for his care as in an independent hospital, that is, privacy, an ideal exposure, and arrangement of rooms should not be sacrificed in the combination; for the going from classroom to bedside, providing there is a physical connection between school and hospital, is a minor matter compared with the privacy and comfort of the patient.

An editorial from the *Journal of the American Medical Association** is so apropos that it is quoted here in full:

"In the discussion of hospital problems, much interest has been shown recently in the educational function of such institutions. The hospital is a center for the instruction of nurses, of internes and sometimes of medical students. Another function frequently mentioned is that of investigation and research, whereby the hospital adds its quota to the advancement of our knowledge of medicine. In many

**Journal of the American Medical Association*, March 28, 1925.

FIG. 450

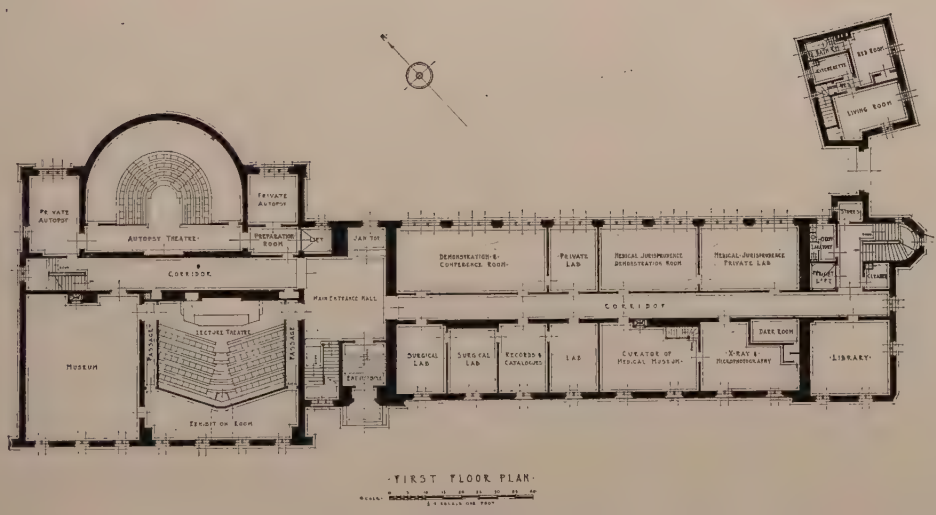



FIG. 451

PLANS, PATHOLOGICAL BUILDING, McGILL UNIVERSITY, MONTREAL, CANADA
Nobbs & Hyde, Architects; Traquair & Carless, Associated Architects;
Stevens & Lee, Consulting Architects

FIG. 452

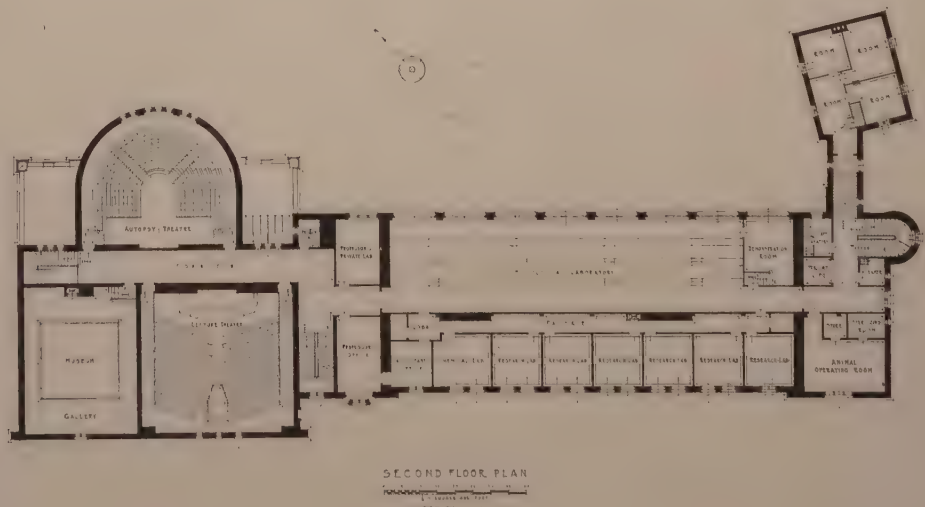



FIG. 453

PLANS, PATHOLOGICAL BUILDING, McGILL UNIVERSITY, MONTREAL, CANADA
Nobbs & Hyde, Architects; Traquair & Carless, Associated Architects;
Stevens & Lee, Consulting Architects

places, also, the educational function of hospitals has been broadened to include the provision of special clinics, medical-pathologic conferences and other medical meetings for the staff and for physicians in the surrounding territory. Where competent teachers are available and clinics have been well developed, certain hospitals are now affiliated with graduate medical schools, so that physicians preparing themselves either for general practice or for specialization can obtain portions of their graduate preparations in these hospitals. Finally, also, hospitals are providing instruction for the people in their communities through their patients, their staff, their nurses and social service workers. By these developments of their educational functions, hospitals are now wielding a great influence for good. The lack of hospitals has undoubtedly been a prominent factor in the abandonment of smaller rural communities by physicians, since well-to-do country people have been forced to go to larger towns and cities for hospital care. An increase in the number of modern hospitals, therefore, even though small, will help to bring a wider distribution of physicians. Through the further development of their educational functions, hospitals will enable these physicians to keep in constant touch with the modern developments and improved methods used in the diagnosis, treatment and prevention of disease. Thus the hospitals will help also to bring the benefits of these improved methods within the reach of a larger proportion of the public."

Another eminent English authority in speaking of a certain large hospital said, "It lacked a soul because it was not connected with a medical school."

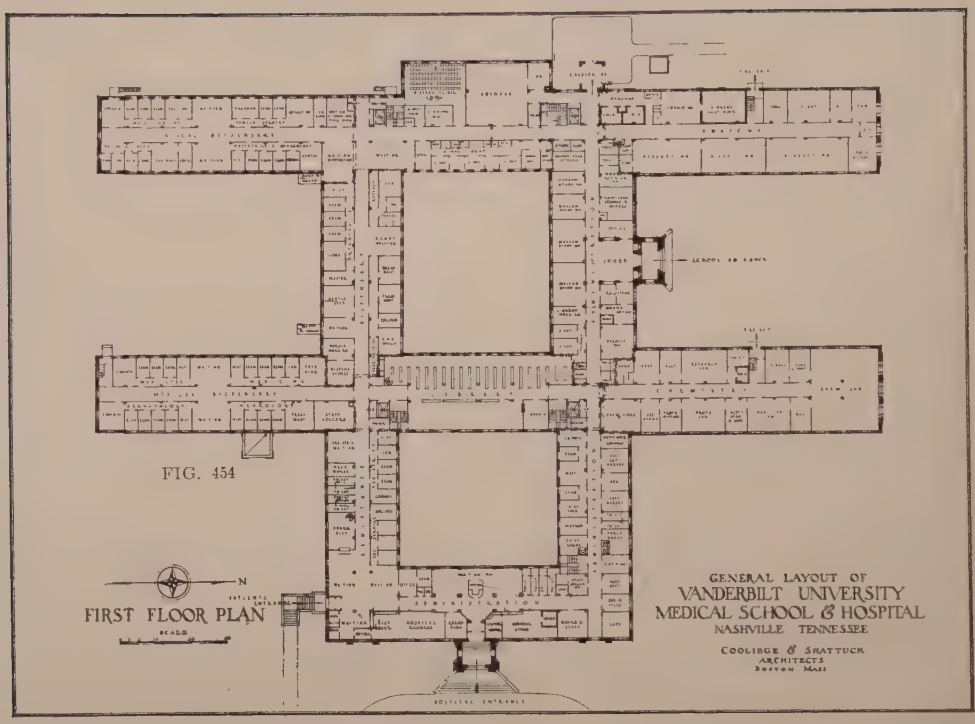
The McGill University Medical School. In the case of the medical school of the McGill University (Figs. 450-453), which is allied with the Royal Victoria Hospital for the clinical teaching (See block plan Fig. 10), the pathological building is placed across the street from the hospital building with a physical connection through an underground passage, affording ample passage for students and for carrying cadavers and specimens, as well as for pipes and conduits.

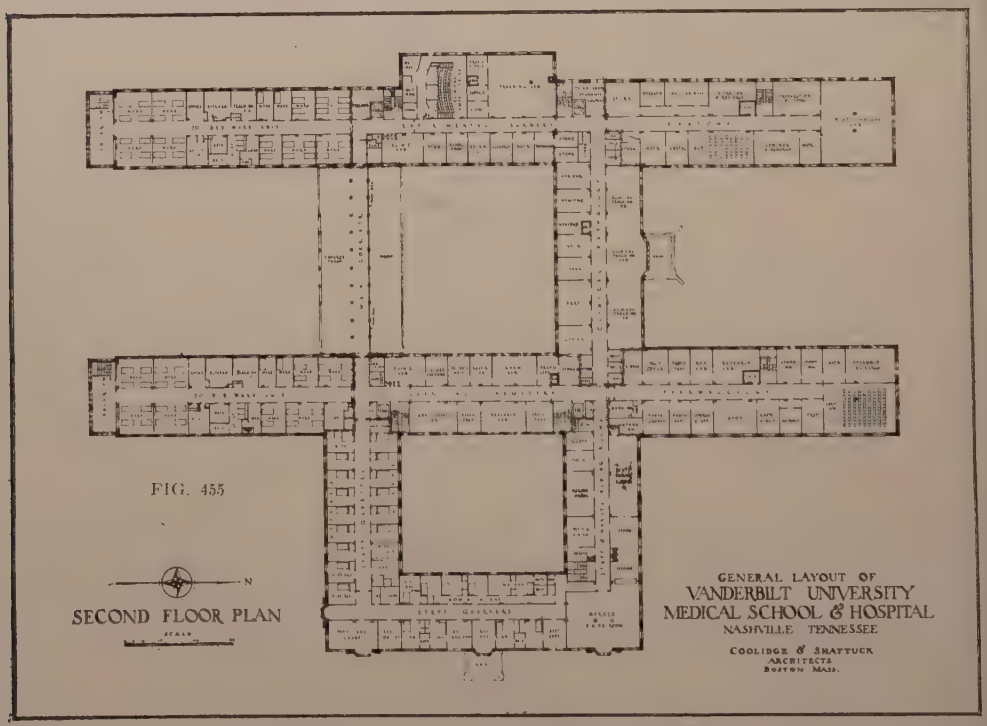
This close proximity allows the laboratory work of the hospital to be carried on with greater facilities than in a local laboratory.

The plan is self-explanatory. The autopsy section is in close proximity with the work rooms, the teaching laboratory so designed as to get the best light and air.

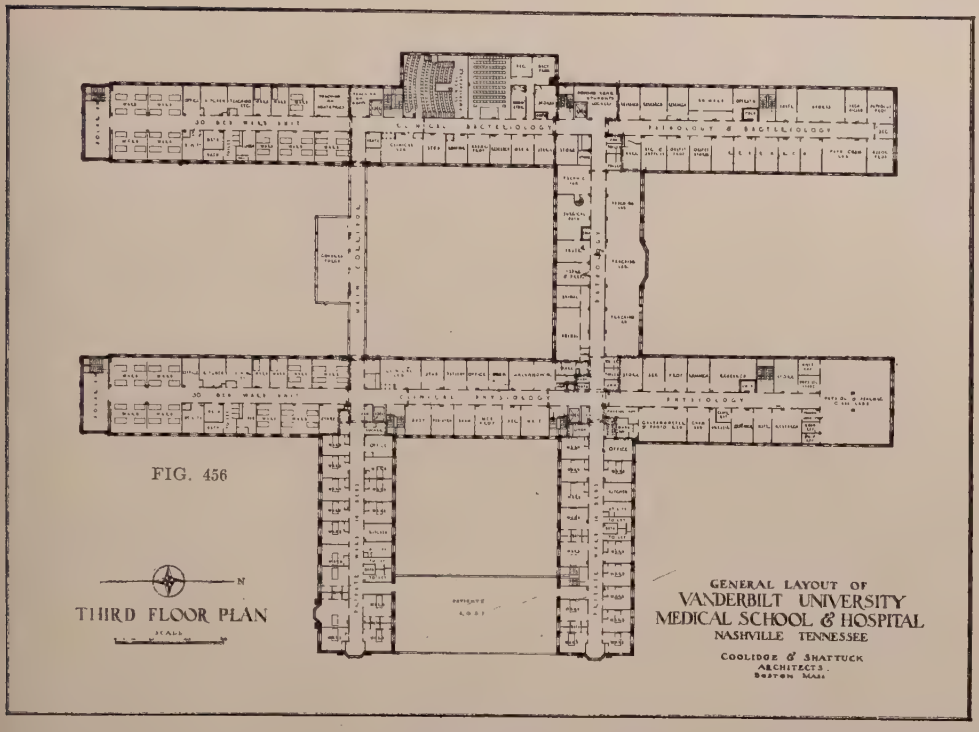
The Vanderbilt University. The description of the plans (Figs. 454-457) here quoted is from the *Journal of the American Medical Association.**

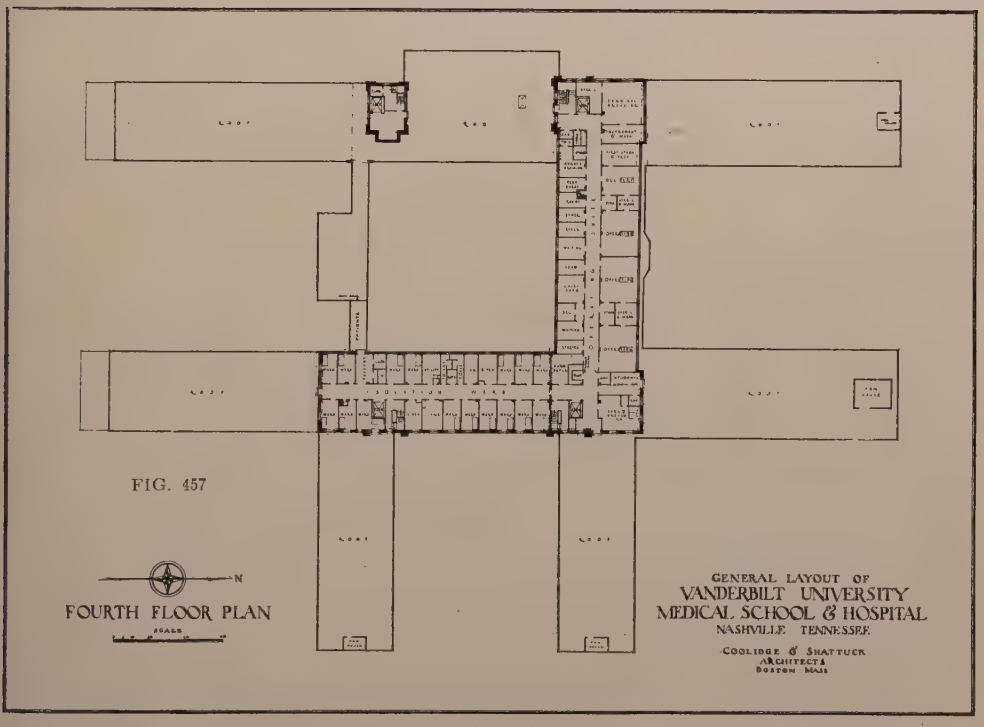
*The Relation of Medical Education to the Medical Plant, by G. Canby Robinson, M. D., Vol. 81, pp. 321-323.



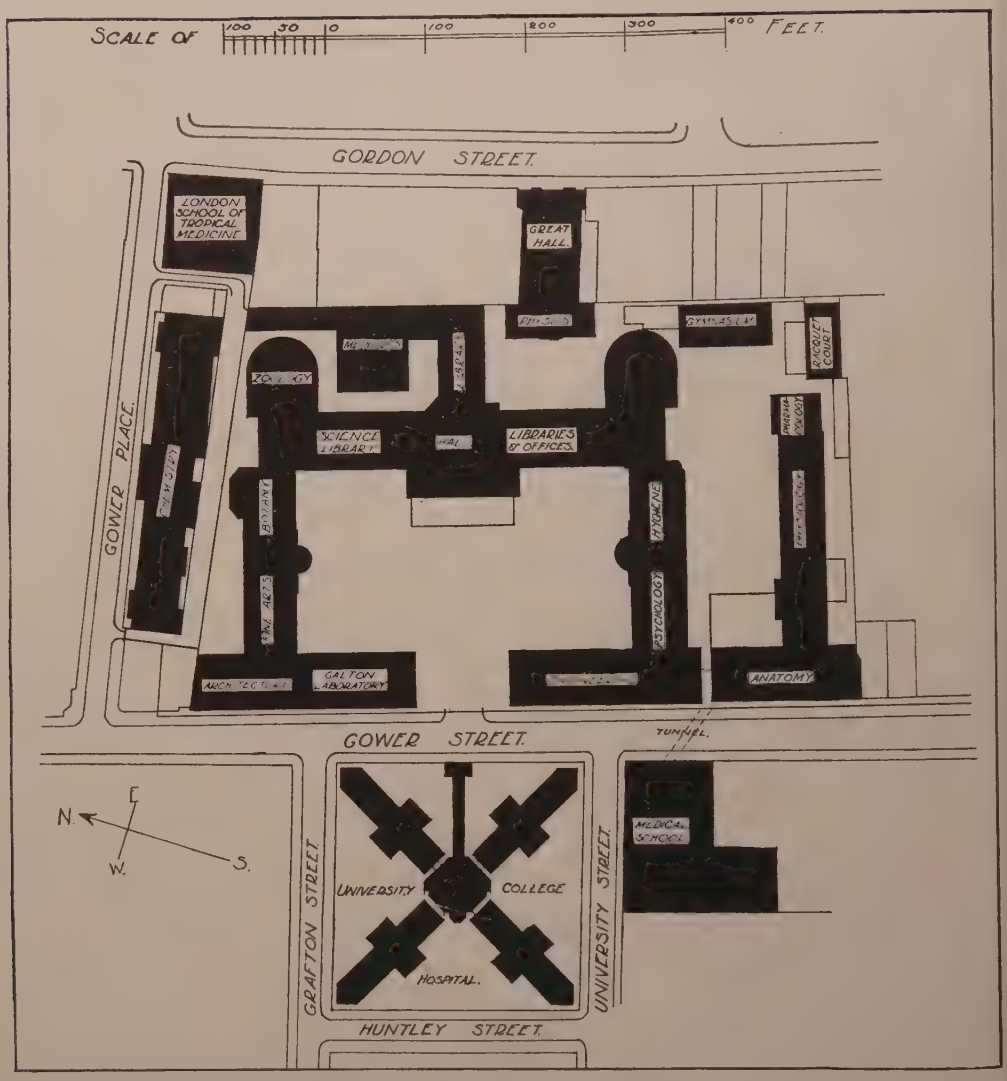




PLANS, VANDERBILT UNIVERSITY MEDICAL SCHOOL & HOSPITAL, NASHVILLE, TENN.
Coolidge & Shattuck, Architects




PLANS, VANDERBILT UNIVERSITY MEDICAL SCHOOL & HOSPITAL, NASHVILLE, TENN.
Coolidge & Shattuck, Architects




Courtesy of *Methods and Problems of Medical Education*

FIG. 458. UNIVERSITY COLLEGE OF LONDON

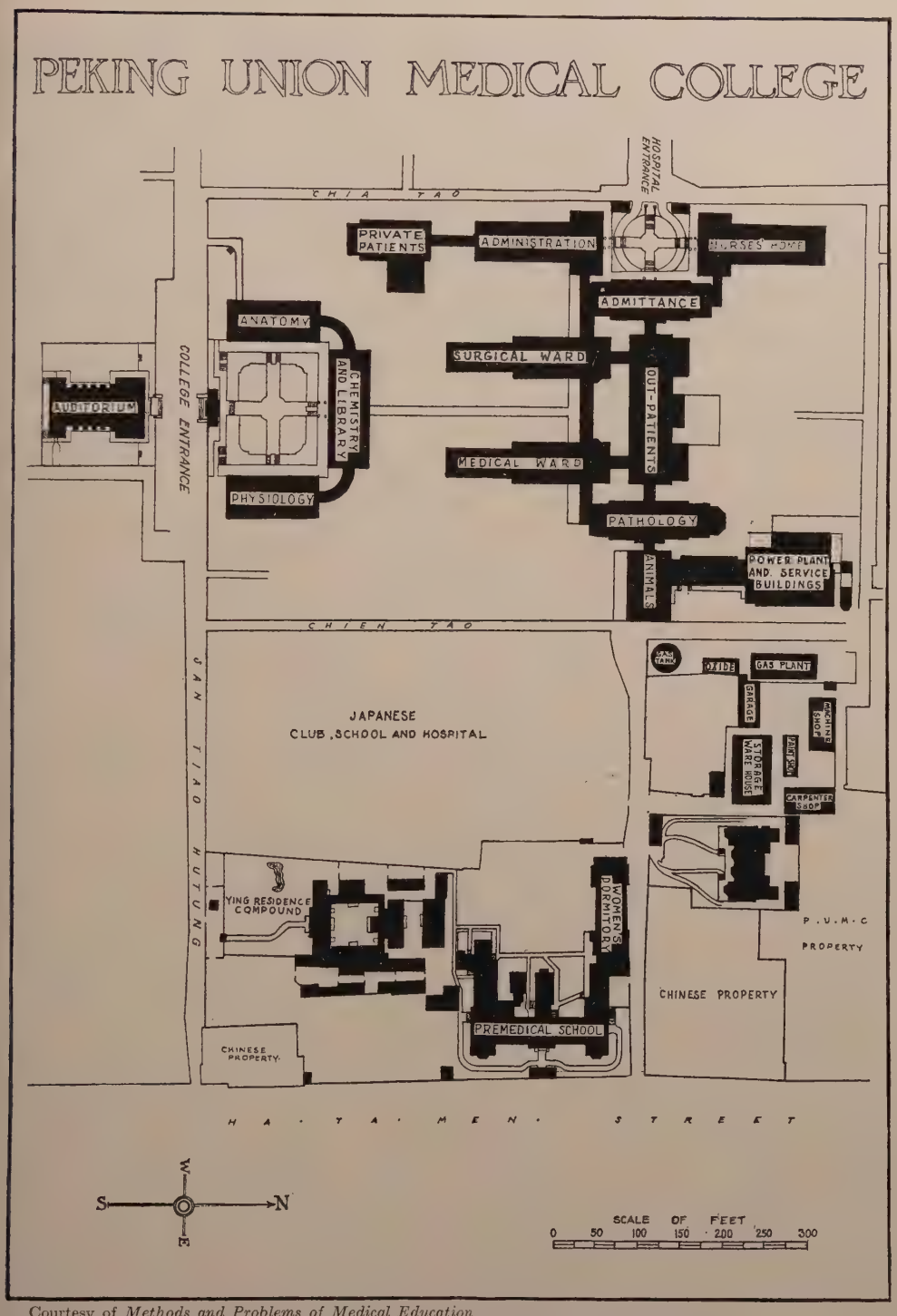
F. M. Simpson, F.R.I.B.A., Architect, London

"A problem of educational policy has been the question of bringing the laboratories and the hospitals of the school into the closest possible contact. In order to accomplish this, it was decided to connect the laboratories and hospital so that in reality they constitute one building. The laboratories form three sides of a court facing north and opening toward the main campus of the university, while the hospital forms a similar group opening toward the south. These two groups are joined by the laboratories of the clinical departments.

FIG. 459. PERSPECTIVE VIEW OF THE RESEARCH AND EDUCATIONAL HOSPITALS OF THE STATE OF ILLINOIS, CHICAGO
Richard E. Schmidt, Garden & Martin, Architects

Courtesy of *Architectural Record*

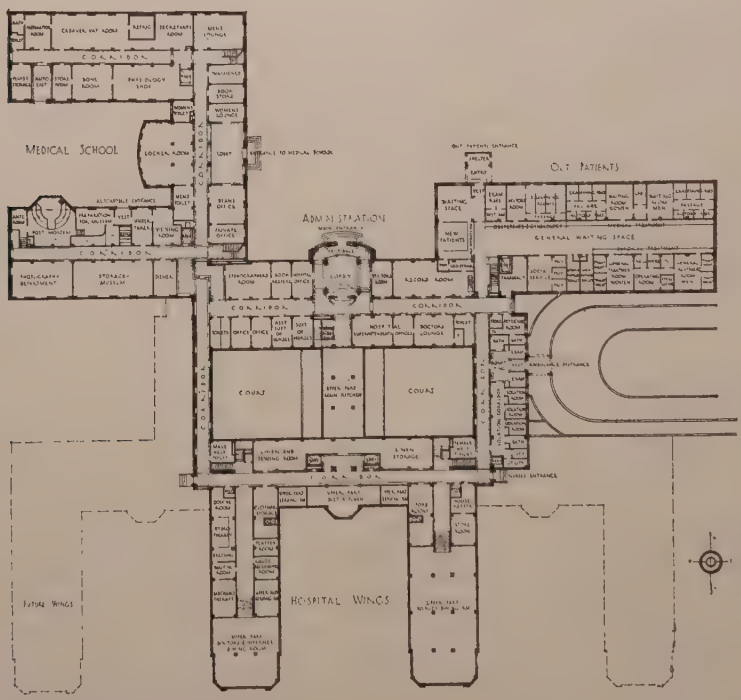
FIG. 460. PLOT PLAN OF THE RESEARCH AND EDUCATIONAL HOSPITALS OF THE STATE OF ILLINOIS, CHICAGO
Richard E. Schmidt, Garden & Martin, Architects




Courtesy of *Methods and Problems of Medical Education*

FIG. 461. PEKING UNION MEDICAL COLLEGE, PEKING, CHINA
Coolidge & Shattuck, Architects

arranged in such a way that the type of work conducted in each one will be carried on in close proximity to the laboratory most closely allied to it. Thus, the laboratory of clinical bacteriology adjoins the main laboratory of bacteriology, that of surgery adjoins anatomy, and that of clinical chemistry and physiology adjoins those of biologic chemistry, pharmacology and physiology. By such assignment of space it is hoped that the barrier between the laboratory and the clinical departments will be eliminated, and that the influence of the



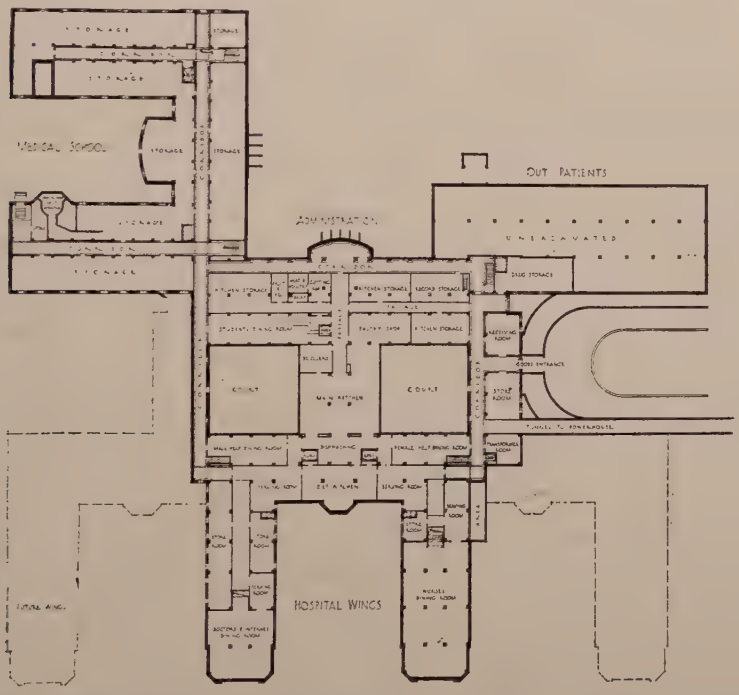

Courtesy of *Modern Hospital*

FIG. 462. GROUND FLOOR, UNIVERSITY OF COLORADO SCHOOL OF MEDICINE, DENVER COLO.
Maurice B. Biscoe, Architect

fundamental sciences will be felt constantly by the clinical staff and by the students throughout their entire course, so that the knowledge and training gained in the laboratories will be carried forward into the practice of medicine.

"Another educational feature expressed in the building plan of the Vanderbilt University school is the position of the library and museum. The library occupies a central position on the first floor,

almost analogous to the hub of a wheel, and no provision for departmental libraries has been made. Stack room on the main floor for approximately thirty-six thousand volumes is provided, with additional room for about fourteen thousand volumes immediately below. The reading room adjoining the stack room will accommodate about seventy readers, and two small studies for intensive literary work are provided. The museum is placed opposite the main entrance of the laboratories.



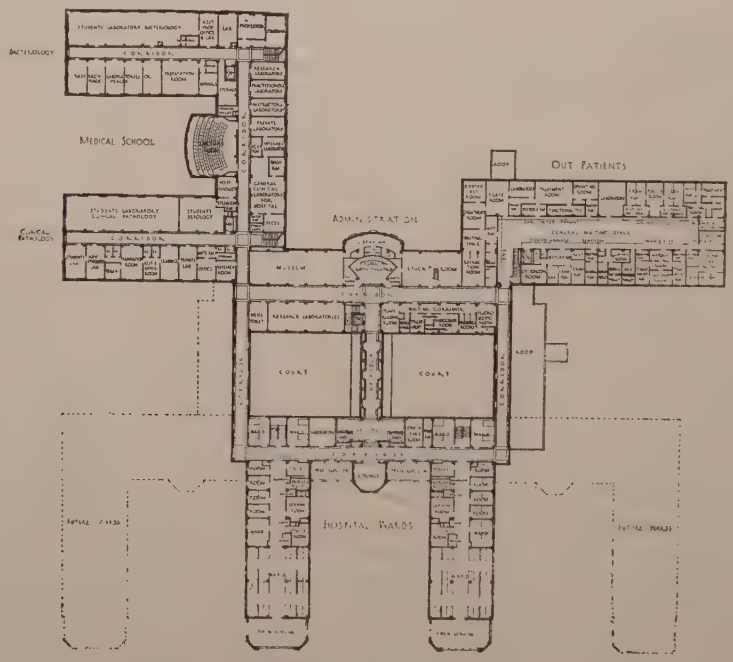

Courtesy of *Modern Hospital*

FIG. 463. BASEMENT FLOOR, UNIVERSITY OF COLORADO SCHOOL OF MEDICINE
Maurice B. Biscoe, Architect

"The admitting office of the hospital adjoins the main entrance hall of the dispensary, in which are rooms for the social service department, the staff of which will be readily accessible to patients being admitted to the hospital or to patients attending the out-patient department. A prominent place is given to the social service department, not only because of the great humanitarian value of a properly conducted hospital social service, but also with the belief that it is a valuable asset in medical education.

"The hospital wards represent a departure from the large wards in general use in this country. A ward unit is composed of thirty beds, but these are so distributed that not more than four patients are in a single space. The main part of the ward, which leads to a closed porch, contains sixteen beds, but this is in turn subdivided by two partitions and a wide corridor.

"No large operating amphitheatre has been provided, but the operating rooms have been made large enough so that groups of students can attend operations, thus expressing another policy of medical education now generally regarded as sound.




Courtesy of *Modern Hospital*

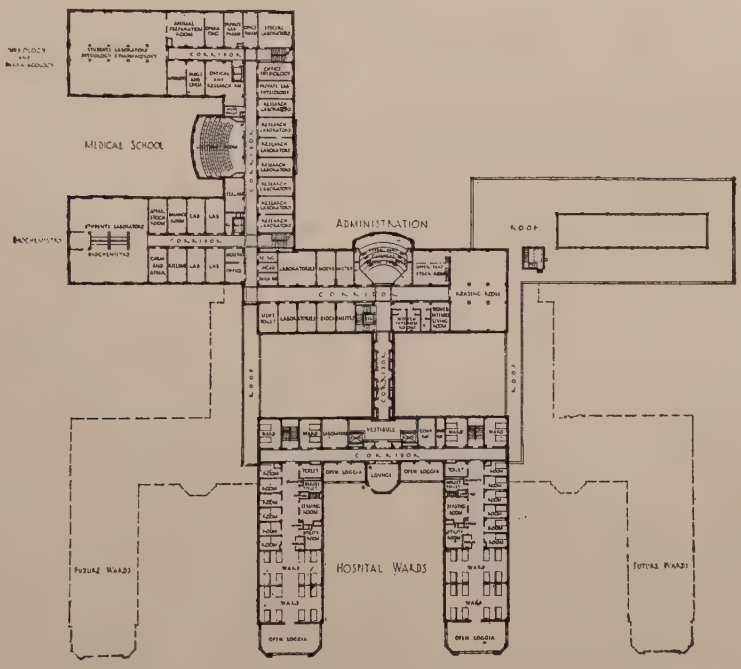
FIG. 464. FIRST FLOOR, UNIVERSITY OF COLORADO SCHOOL OF MEDICINE

"The hospital will contain approximately 170 beds, twenty-seven of which are arranged for patients paying professional fees. Sixteen beds are devoted to contagious cases. This is a small number of beds for educational purposes, but it constitutes a hospital as large as can be well maintained with the funds available for this purpose."

In the case of the UNIVERSITY COLLEGE HOSPITAL in London (Fig. 458) the medical school is across the street from the hospital and it has underground connection with the main University group.

RESEARCH AND EDUCATIONAL HOSPITALS OF THE STATE OF ILLINOIS. The State Department of Public Welfare and the Illinois

State University agreed "to construct and maintain a group of research and educational hospitals in the medical center of Chicago where the best medical, surgical and laboratory skill can be readily obtained; to provide medical treatment for the indigent sick of the State; to give young men and women proper medical education and training that will enable them to become active soldiers in the welfare for the prevention as well as the cure of disease; to help practicing physicians of the State to keep in touch with the latest and best




Courtesy of *Modern Hospital*

FIG. 465. SECOND FLOOR, UNIVERSITY OF COLORADO SCHOOL OF MEDICINE

methods of preventing and curing human ailments; to tell the people of the State how to keep themselves physically fit."*

This group will provide for education and research work, for diagnosis and treatment for a large body of patients, as well as for the training of nurses and social workers.

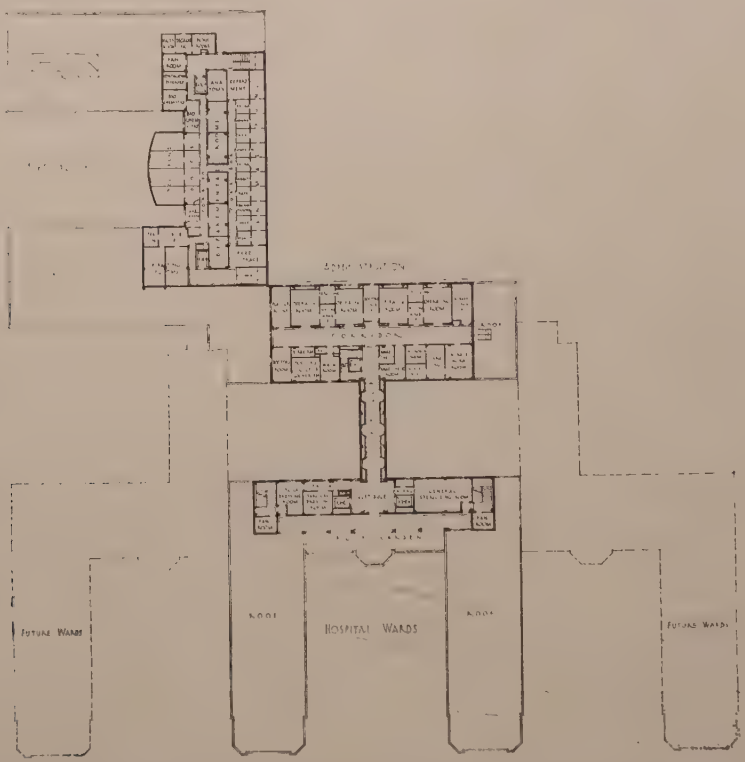
Such state and city institutions as this should be provided in every state. The plot plan (Fig. 459) shows the portion of the work now completed and the contemplated portion, and the perspective (Fig. 460) shows the finished institution.

In the layout of the PEKING UNIVERSITY MEDICAL COLLEGE, the

**Architectural Record,* Pages 301, 302 and 303, October, 1925.

medical school building is slightly removed from the hospital group, but with a corridor connection to the center of the hospital group, and it will be noted that the pathology building functions directly with the main hospital (Fig. 461).

The problem of the combination school and hospital is solved in a very comprehensive way in the UNIVERSITY OF COLORADO SCHOOL OF MEDICINE AND HOSPITAL (Figs. 462-466). Designed with flexi-




Courtesy of *Modern Hospital*
FIG. 466. FOURTH FLOOR, UNIVERSITY OF COLORADO SCHOOL OF MEDICINE

bility both as to the hospital and the medical school unit, there is provision in every case for possible changes in the technique and administration. The group comprises general hospital, out-patient department and medical school, as well as residence and school for nurses.

The medical school was originally planned to accommodate 200 students, with units so placed that the departments might be changed in size as the methods of teaching might demand.

The hospital is designed for free patients and is well cut off from although physically connected on each floor by corridors to the ad-

FIG. 467. COLUMBIA PRESBYTERIAN HOSPITAL GROUP
James Gamble Rogers, Architect

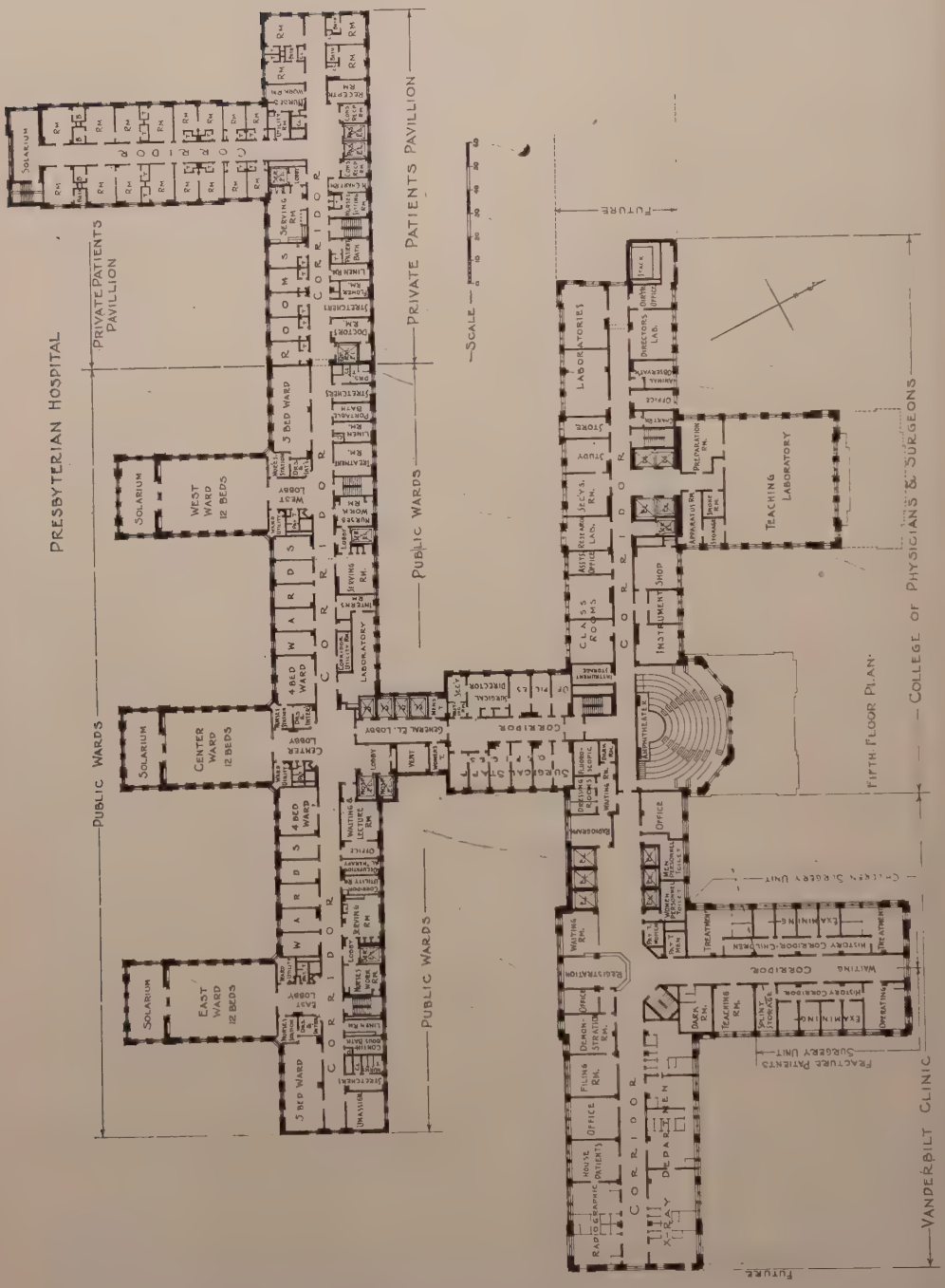



FIG. 468. TYPICAL PLAN, COLUMBIA-PRESBYTERIAN HOSPITAL, NEW YORK, N. Y.
James Gamble Rogers, Architect

ministration building, and thus to the school. It will be noted that the Rigs type of ward mentioned elsewhere in this book is pretty largely used for the larger units, which afford flexibility and provide for easy transition from large to small wards.

The location of the hospital units was carefully studied by the architect to insure the maximum amount of sunlight and air.

The original plans call for two pavilions three stories each affording a capacity of 150 beds, which can be increased to 300 beds by the addition of three stories on each building; or with complete pavilions as indicated on the plan, accommodations can be secured for 600 beds.

The operating department is on the fourth floor of the administration building (Fig. 466) within easy access of both the hospital and the medical school.

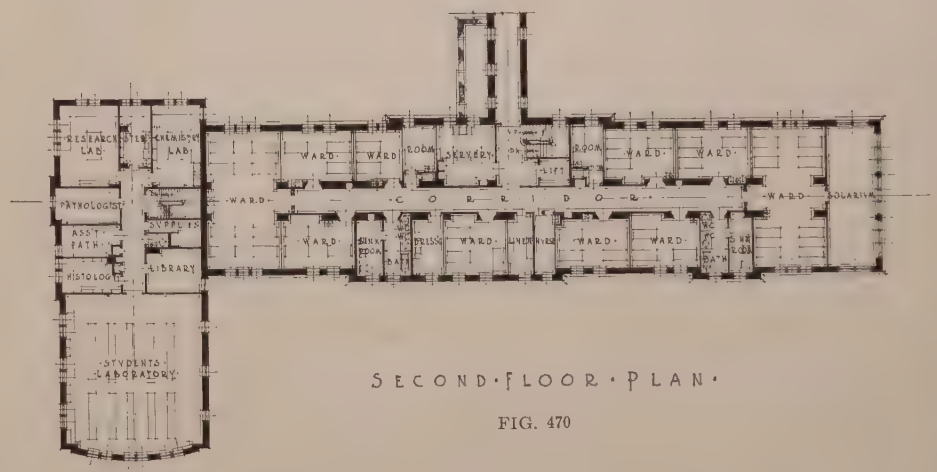
From a careful study of the plans one will note the intimate relation of one department to the other, which are so planned that each department may function independently or in co-relation to the other.

One of the greatest developments of the medical school and hospital combination in this country is the combination of the College of Physicians and Surgeons of the Columbia University, the Presbyterian Hospital and the Vanderbilt Clinic (Figs. 467-468), which buildings are being erected at the time of writing this volume. These departments are being housed in multi-story buildings at Broadway and 165th Street—one of the most magnificent sites in New York overlooking the Hudson River, with every prospect of being the most complete medical unit under one large comprehensive scheme in this country, and perhaps in the world.

Unlike many of the others described in this chapter, the institutions of the group, while functioning as complete units, will not lose their individual identities; hence the Presbyterian Hospital, which is widely known for its wonderful and progressive work, will function as a hospital both for public and private patients; and with the physical connection on the eleven stories of the hospital building to the units of the medical school and the Vanderbilt clinic all will combine to provide clinical material for the medical school.

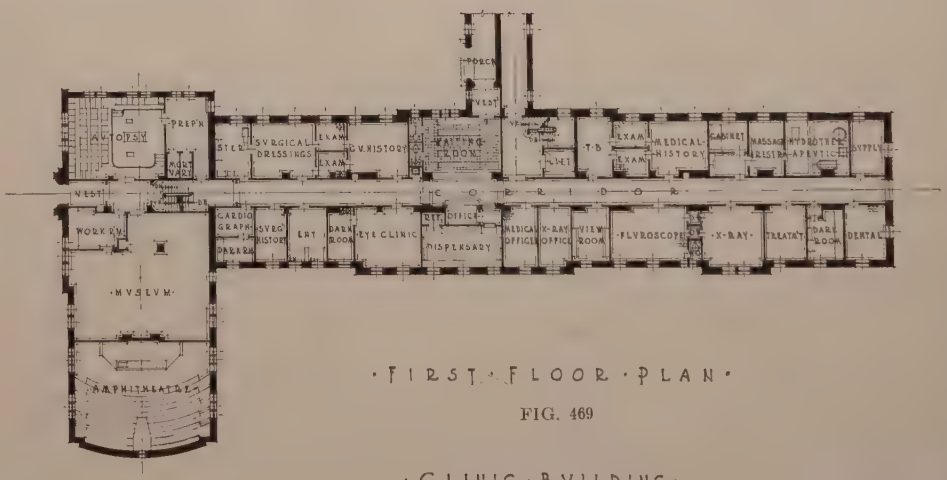
In a glance at the typical plans herewith published it will be noted that while there is a physical connection between the medical school, the clinic unit and the hospital, to go from one department to another one must pass through the administrative unit of the hospital floor, thus guarding very largely the privacy of the hospital.

The private patients' pavilion is placed at a distance from the center and so affords still greater privacy.




SECOND FLOOR PLAN

FIG. 470



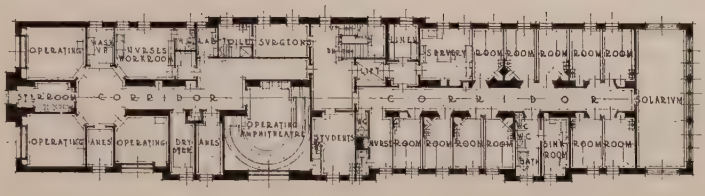

FIRST FLOOR PLAN

FIG. 469

CLINIC BUILDING
KINGSTON GENERAL HOSPITAL
KINGSTON ONTARIO
STEVENS & LEE ARCHITECTS
TORONTO ONT CANADA

SCALE
1/8 INCH EQUALS ONE FOOT

KINGSTON CLINIC HOSPITAL
Stevens & Lee, Architects




FOURTH FLOOR PLAN

FIG. 472

THIRD FLOOR PLAN

FIG. 471

CLINIC BUILDING
KINGSTON GENERAL HOSPITAL
KINGSTON ONTARIO
STEVENS & LEE ARCHITECTS
TORONTO ONT CANADA

SCALE 1/16 INCH EQUALS ONE FOOT

KINGSTON CLINIC HOSPITAL
Stevens & Lee, Architects

The lecture rooms or clinical amphitheatres are placed midway between the medical school, the Vanderbilt clinic and the hospital, which affords easy access to each unit.

To enter the hospital from the medical school or clinic, the student must pass from his classroom or laboratory, through the corridor upon which the staff offices are located, into the central lobby of the hospital. This connection is made only in one location on each floor.

The Vanderbilt Clinic, only one floor of which is shown, with the elevators and stairs will provide for all departments.

The medical school, with its laboratories and lecture rooms on the many stories and with its vital connections to both clinic and hospital, affords every opportunity for the closest co-operation of all departments.

The pavilion for private patients, while connected floor by floor with the general hospital, functions as a separate and distinct unit with its own service and utilities.

The new clinic building of the Kingston General Hospital (Figs. 469-472), which is closely connected with that institution (Fig. 19B), fulfills a triple need: as out-patient department for the institution, ward building for public patients, and laboratory and lecture rooms for the medical department of Queen's University.

The laboratory section is two stories in height and contains a students' general laboratory, as well as research laboratory, a large lecture hall or amphitheatre, and autopsy department.

The out-patient department, which occupies the entire first floor of the patients' building, functions in the usual way, with its various departments, including X-ray and physiotherapy. The second and third stories are occupied by ward patients, with the necessary offices and utilities. On the fourth floor is the operating department for the entire hospital, with three major operating rooms and a large amphitheatre for the use of the university students. On this floor also are the private rooms in a section removed from the operating department.

This building functions:

1st. For University pathological work and lecture rooms.
2nd. For out-patient, X-ray, and physiotherapy departments.
3rd. For ward patients.
4th. For operating department.
5th. For private patients.

We have shown a few of the many examples of medical school hospitals in this and other countries and regret our inability to secure the plans of other groups.

# CHAPTER XVI

## THE NURSES' RESIDENCE

PERHAPS next in importance to the care of the patient is the care of the nurse, for to do her best and give comfort and help to the sick a nurse must conserve her own health and strength. When off duty, she must be able to go out of the environment of the sick room, out of the sound of suffering, out of hospital smells, and in fact out of the hospital atmosphere.

Any hospital of considerable size should have its nurses' residence. This should be a separate building, not too remote from the hospital, but far enough away so that the noises of an entertainment, a dancing party or a romp will not disturb the patients.

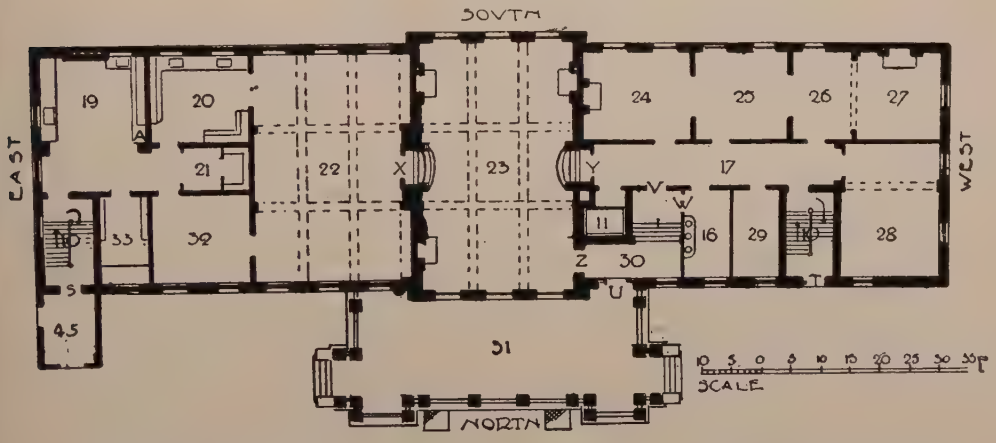



FIG. 475. NURSES' RESIDENCE, HOSPITAL FOR SICK CHILDREN, TORONTO, CANADA. GROUND FLOOR.

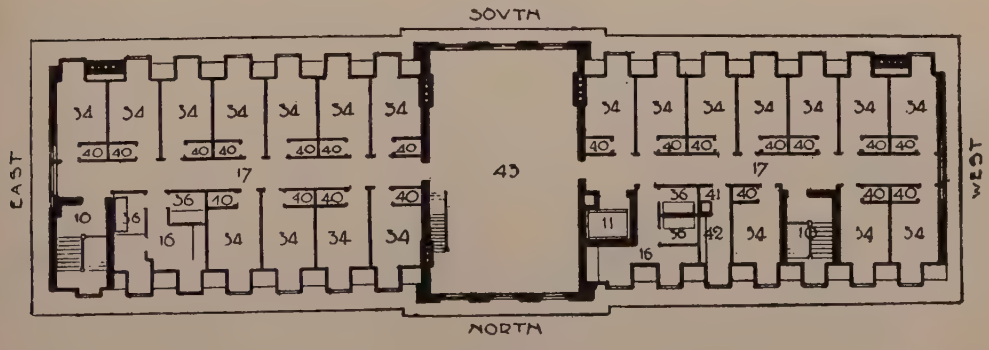



FIG. 476. NURSES' RESIDENCE, HOSPITAL FOR SICK CHILDREN, TORONTO, CANADA. FIRST FLOOR.

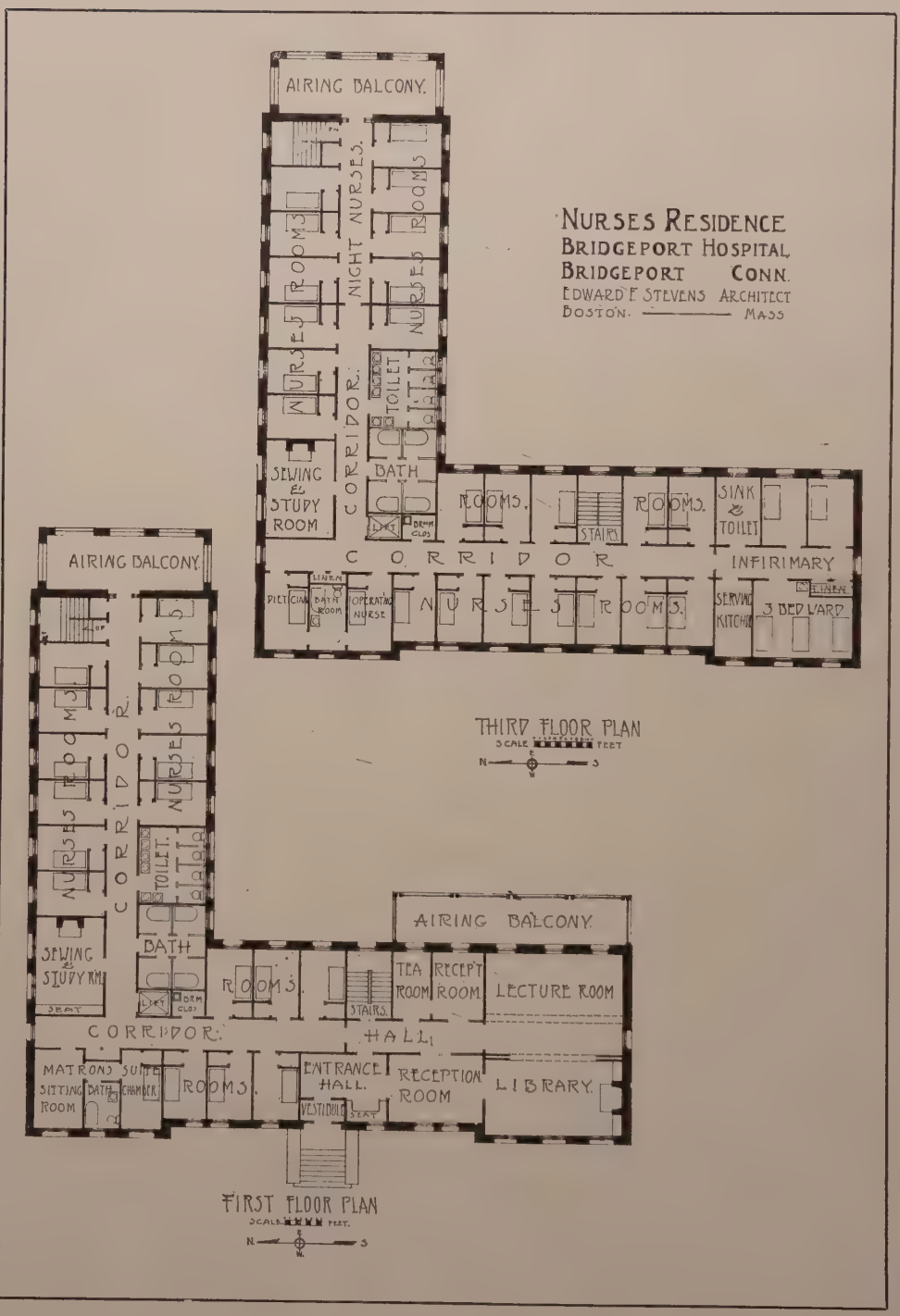

NURSES RESIDENCE
BRIDGEPORT HOSPITAL
BRIDGEPORT CONN.
EDWARD F STEVENS ARCHITECT
BOSTON. MASS
AIRING BALCONY.
NURSES ROOMS.
NIGHT NURSES.
CORRIDOR.
TOILET
BATH
SEWING & STUDY ROOM
ROOMS.
STAIRS
SINK & TOILET
INFIRMARY
LINEN
DIETICIAN
BATH ROOM
OPERATING NURSE
NURSES ROOMS.
SERVING KITCHEN
3 BED WARD
THIRD FLOOR PLAN
SCALE FEET
AIRING BALCONY
NURSES ROOMS
CORRIDOR
TOILET
BATH
SEWING & STUDY RM.
SEAT
LIFT
DRM CLO.
ROOMS.
STAIRS
TEA ROOM
RECEPT ROOM.
LECTURE ROOM
HALL
MATRONS SUITE
SITTING ROOM
BATH
CHAMBER
ROOMS.
ENTRANCE HALL.
VESTIBULE
SEAT
RECEPTION ROOM
LIBRARY.
FIRST FLOOR PLAN
SCALE FEET.

FIG. 477.

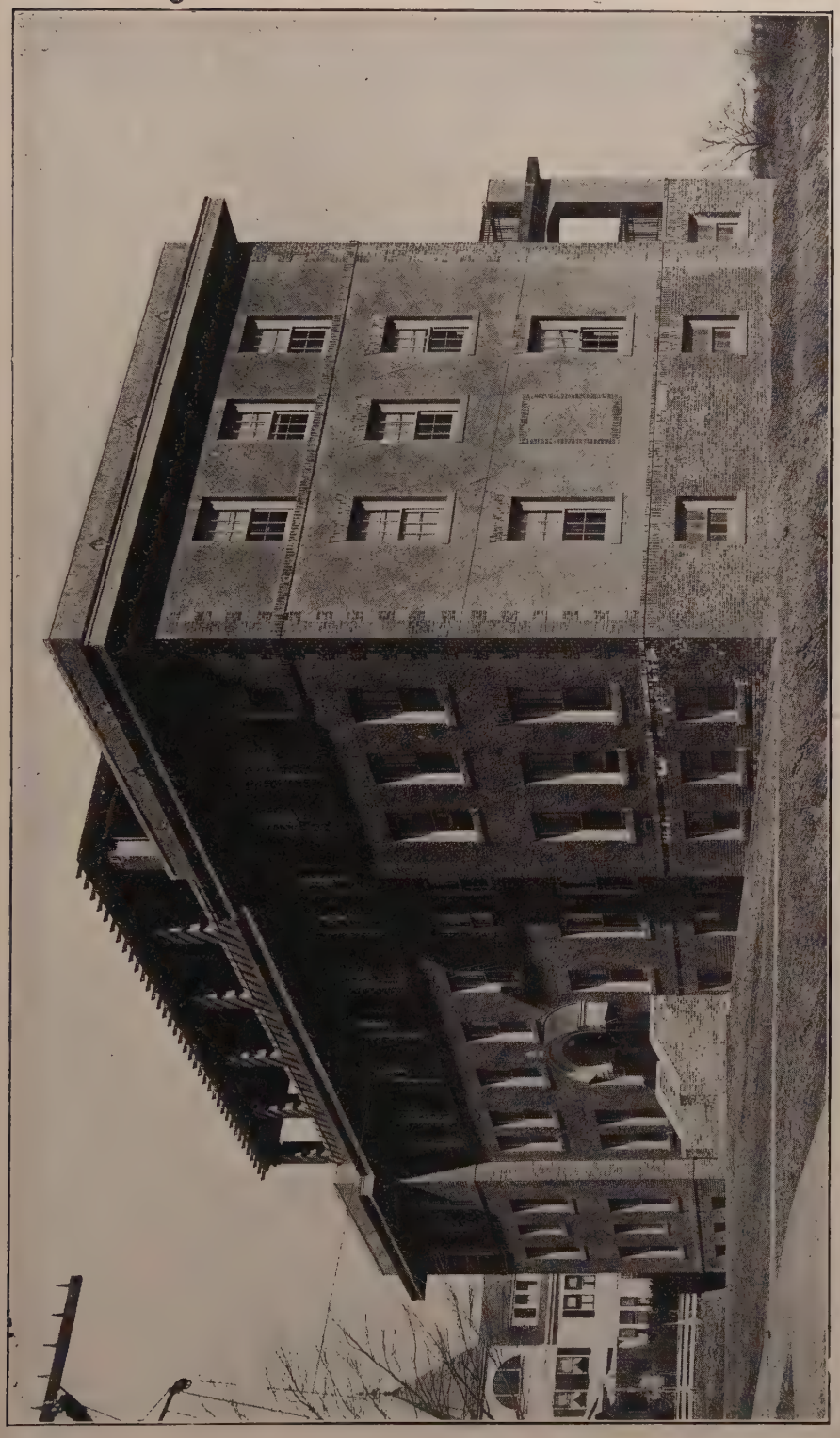


FIG. 478. NURSES' RESIDENCE, BRIDGEPORT HOSPITAL, BRIDGEPORT, CONN.
Edward F. Stevens, Architect.

FIG. 479. VIEW FROM REAR, NURSES' RESIDENCE, BRIDGEPORT HOSPITAL, BRIDGEPORT, CONN.

The more attractive and homelike this building can be made and the more alluring it can be made to the young woman who is taking up nursing, the better will be the class of women who will come to it and, in the end, the better will be the care that the patient will receive.

No matter how small the appropriation for a nurses' home, one should plan for nothing but single rooms. The nurse's work on duty is most exacting, and every nurse, whether pupil or graduate, should have her own separate room. It need not be large, only enough for a single bed, closet, dresser, and study desk. These can be fitted into an area 8 ft. 0 in. by 12 ft. 0 in. This is small enough so that two beds or cots cannot be put in. If a larger room is provided, it means that the time will come when the rooms will be made to accommodate two nurses, and the original idea of privacy will be destroyed. The closet should be large and, if possible, lighted by a window. An adjustable electric drop light can be made to serve both for study and toilet light. This is the minimum amount of light, and of course can be increased to any extent.

The living-room should be homelike and refined. It should have fireplace, settle seats, and cozy corners. There should be a number of

FIG. 480. STUDY ROOM, NURSES' RESIDENCE, BRIDGEPORT HOSPITAL, BRIDGEPORT, CONN.

reception rooms where the nurses may meet their friends, and a sitting or study room on each floor.

There should be a small tea kitchen with gas stove and other conveniences (Fig. 498), where the nurses may prepare an occasional "spread" or the refreshments of an evening party.

A large trunk room is necessary, with easily accessible racks for trunks. A petty laundry, equipped with set tubs and ironing boards, should be provided in the basement.

Classrooms for demonstration and class work should be planned for in a well-lighted section of the building. These classrooms should be well equipped for demonstration in all kinds of hospital technique. (See Educational Buildings.)

There must be ample toilet facilities on each floor—one tub and one watercloset for each five or six nurses, one washbasin to every four. There should be both shower and tub baths. If possible, bowls with hot and cold water should be placed in every room. There should be a slop sink and broom closet on each floor.

FIG. 481. SUPERINTENDENT'S SITTING ROOM, NURSES' RESIDENCE, BRIDGEPORT HOSPITAL, BRIDGEPORT, CONN.

There should be storage room provided for linen and blankets. There should be a sewing-room or space for a sewing machine and cutting table.

Closets should be of ample size, remembering that they contain belongings for a period of three years. They should be lighted either by a window from the bedroom, or an electric light, the window being the more economical.

Space should be set aside for nurses on night duty, preferably in the upper story, away from the noise. These rooms should be on a separate corridor.

An infirmary for sick nurses, fitted as a hospital unit, should be provided in every large home.

There should be a piazza and balconies wherever space and money will permit, preferably on the sunny side. If the roof be flat, arrangement should be made to use it for outdoor sleeping as well as for recreation.

FIG. 482. TYPICAL NURSE'S ROOM, NURSES' RESIDENCE, BRIDGEPORT, HOSPITAL, BRIDGEPORT, CONN.

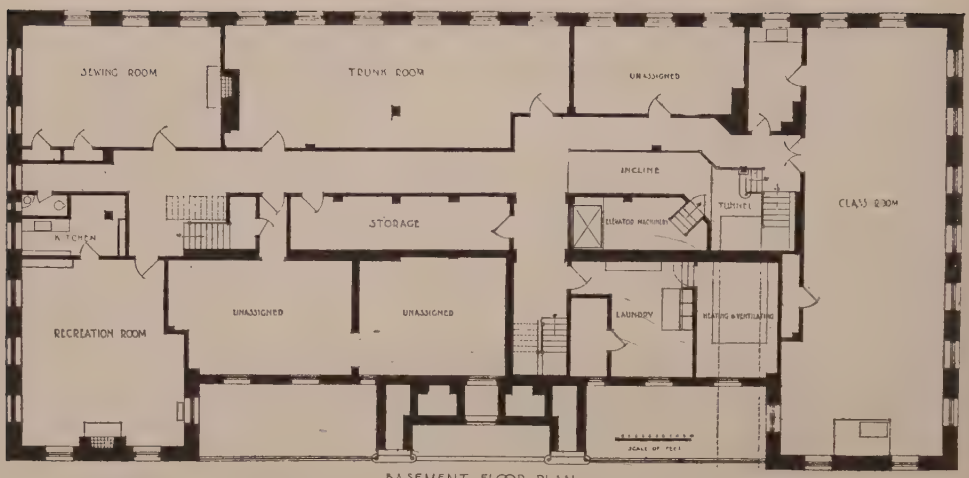
In the larger homes for nurses, it may be desirable to provide a separate kitchen and dining-room in the building. In small institutions it is more economical to place the nurses' dining-room near the main hospital kitchen.

Dr. Donald Mackintosh,* in writing on hospital construction, places the nurses' residence of HOSPITAL FOR SICK CHILDREN, Toronto, Canada (Figs. 475, 476), as the best example of convenience, and the plans are reproduced here. It is certainly a model home, with its great reception hall, dining-rooms and kitchen, its swimming pool and gymnasium, its sitting and study rooms, etc.

The nurses' residence at the BRIDGEPORT HOSPITAL, Connecticut (Figs. 477-482), planned on the L-shape with provision for the future extension completing the U-form, is built on the adjoining lot to the hospital.

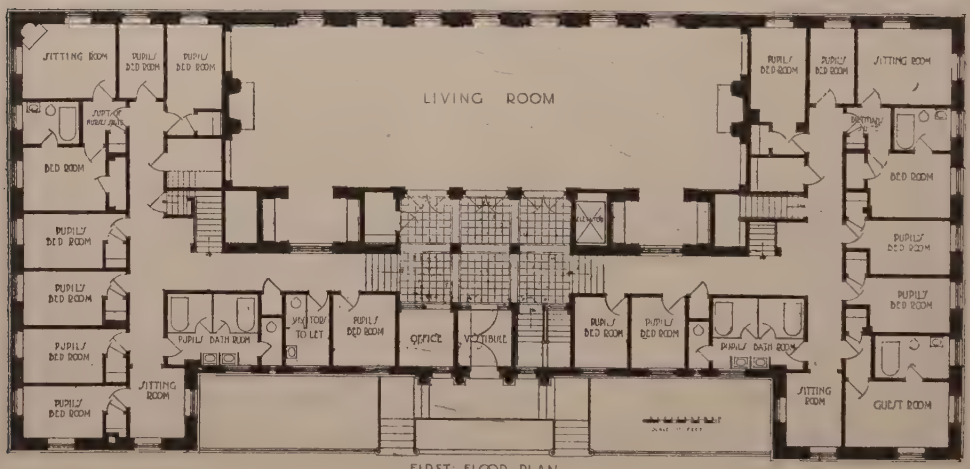
Reception rooms adjoin the entrance, and the social and lecture

*"Construction, Equipment and Management of a General Hospital." Published by William Hodge & Co., Glasgow.



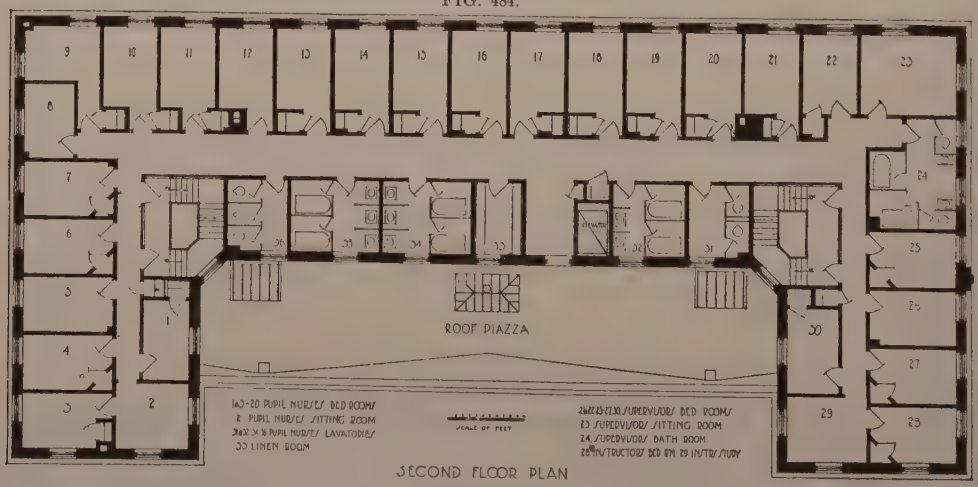

BASEMENT FLOOR PLAN

FIG. 483.




FIRST FLOOR PLAN

FIG. 484.




SECOND FLOOR PLAN

FIG. 485.

NURSES' RESIDENCE, MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASS.

Coolidge & Shattuck, Architects

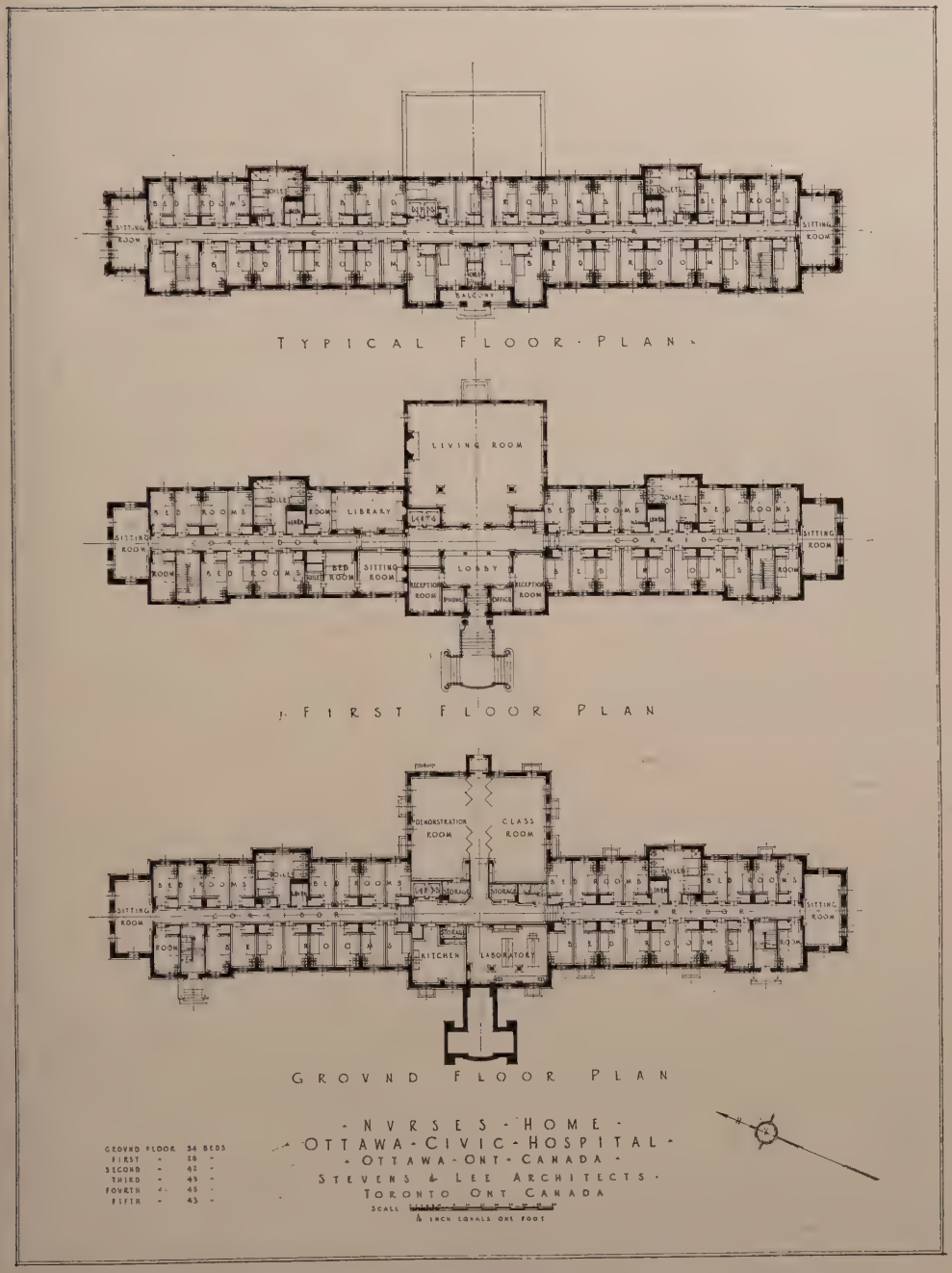



FIG. 486. FLOOR PLANS, NURSES' RESIDENCE, OTTAWA CIVIC HOSPITAL
Stevens & Lee, Architects

FIG. 486A. ENTRANCE HALL, NURSES' RESIDENCE, OTTAWA CIVIC HOSPITAL, OTTAWA, ONT.

FIG. 488A. NURSES' RESIDENCE, OTTAWA CIVIC HOSPITAL, OTTAWA, ONT.

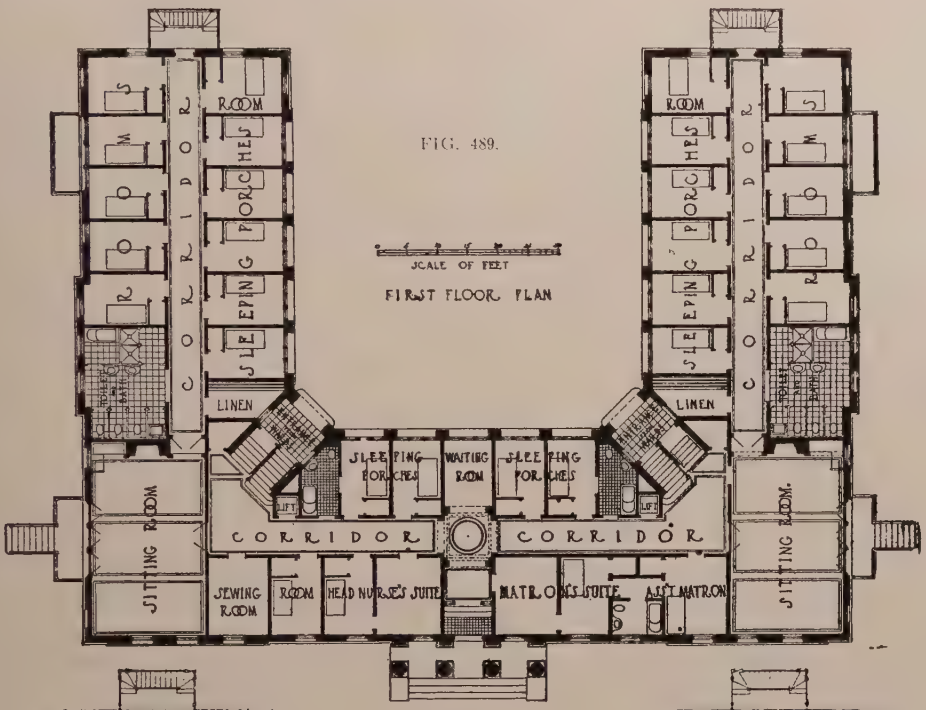



FIG. 489.

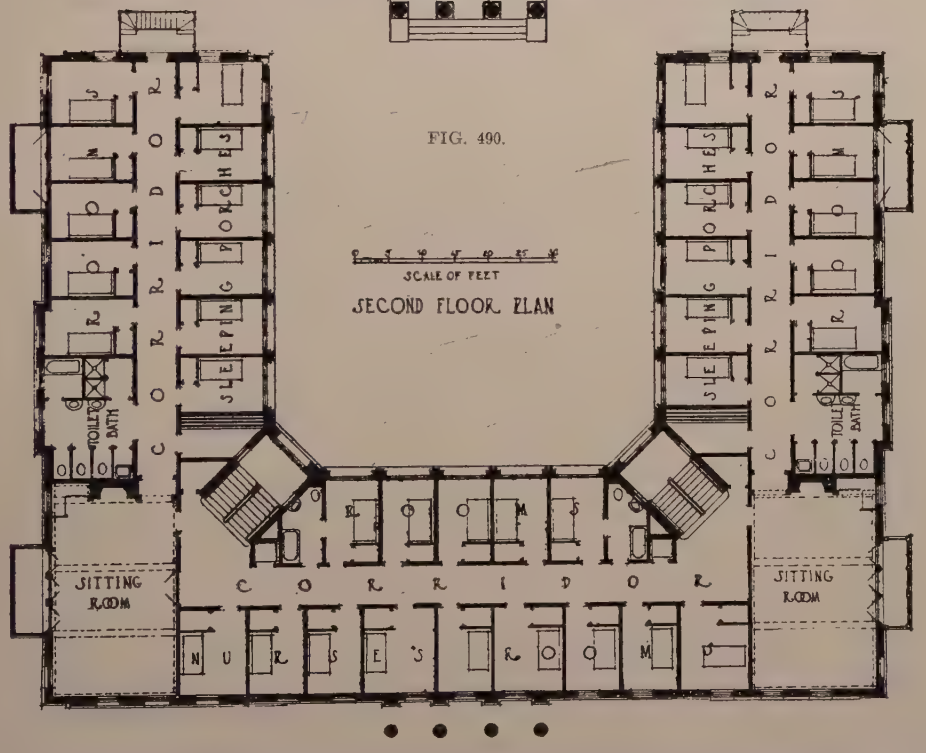



FIG. 490.

MASSACHUSETTS STATE INFIRMARY HOME FOR NURSES
John A. Fox and Curtis W. Bixby, Architects

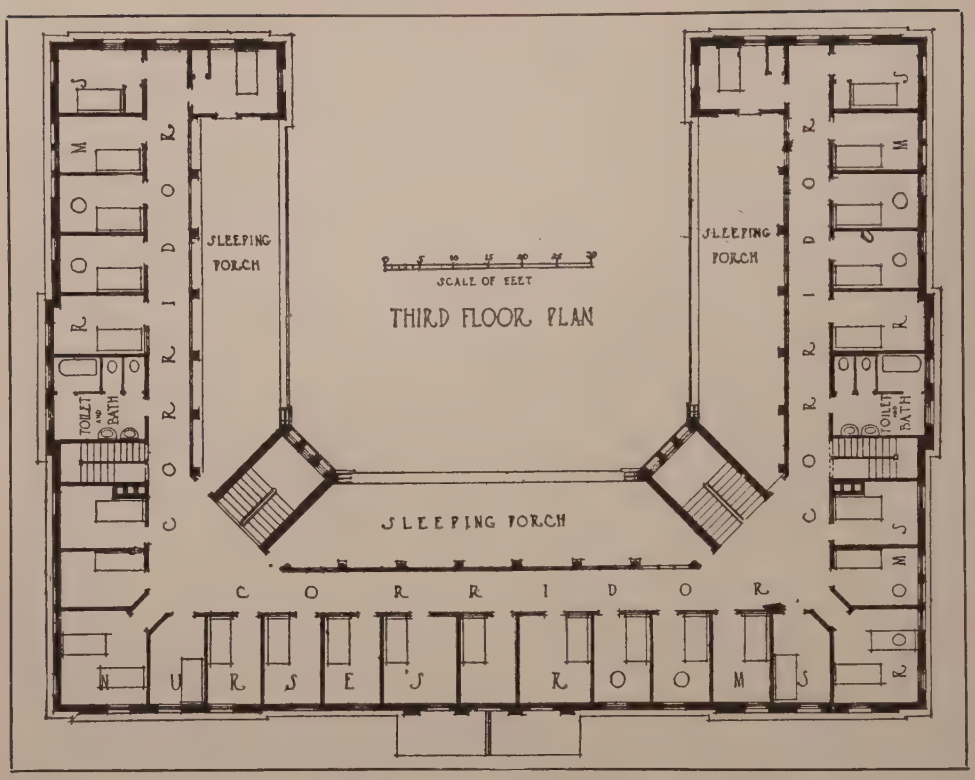



FIG. 491. MASSACHUSETTS STATE INFIRMARY HOME FOR NURSES
John A. Fox and Curtis W. Bixby, Architects

rooms are connected. The suite of the superintendent of nurses is at the northwest corner, and consists of two small rooms and bath. There is a study room on each floor. A small infirmary of four rooms is provided for the care of the sick nurse. The roof garden is sufficiently large for all to sleep in the open.

The nurses' residence of the Massachusetts General Hospital, Boston (Figs. 483-485), is an excellent example of a large building. Attention is called to the spacious reception room and to the guest suite on the first floor.

The Ottawa Civic Hospital, Ottawa (Figs. 486-488), plans to house 210 nurses in single rooms. The building has six floors. On the ground floor are class and demonstration rooms, trunk storage, laundry, and tea-room. On the first floor is a living-room thirty by fifty feet in size, a reception room, library, and the office. On each floor there are sun rooms which constitute small sitting-rooms, and ample balconies. The superintendent's suite has its own bath and balcony. Each nurse's room has hot and cold water. One bath is provided for

FIG. 492

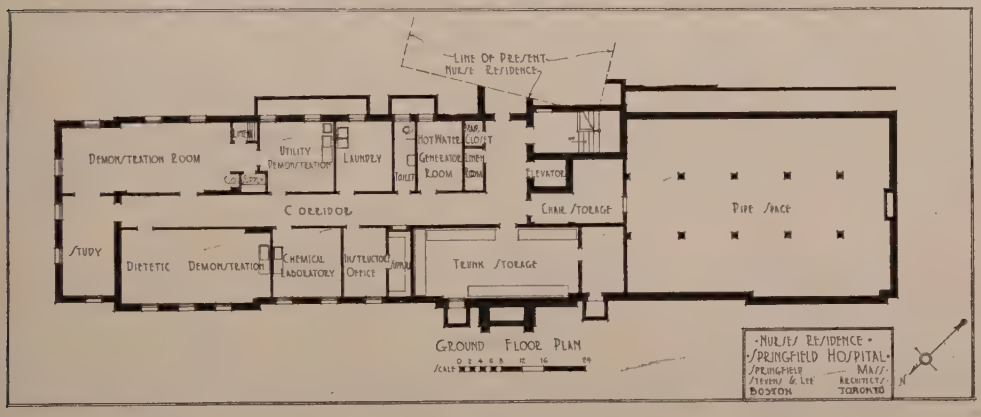



FIG. 493.

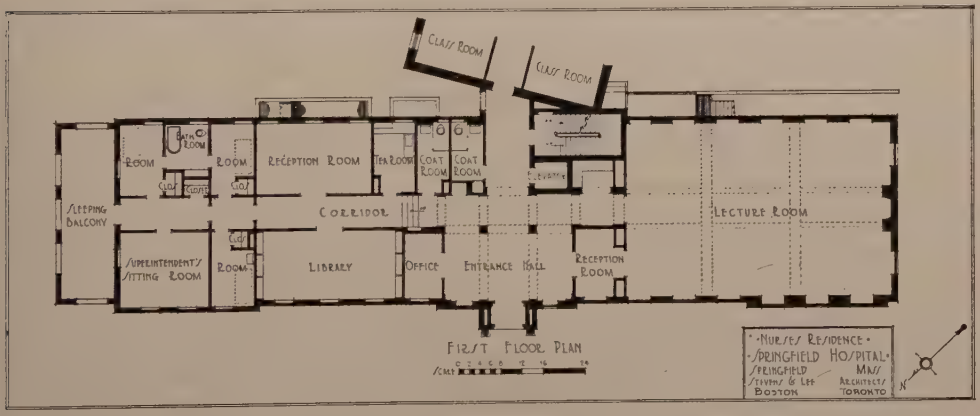
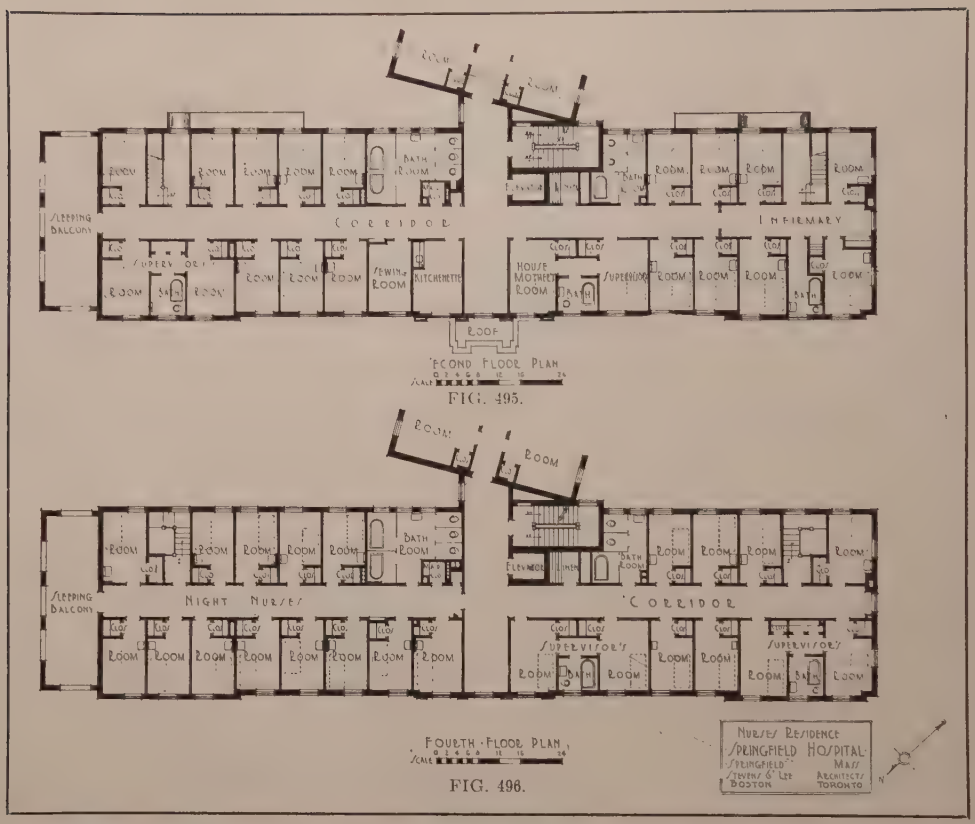



FIG. 494.

FIG. 492. NURSES' RESIDENCE, SPRINGFIELD HOSPITAL, SPRINGFIELD, MASS.



Living Room

FIG. 497. NURSES' RESIDENCE, SPRINGFIELD HOSPITAL, SPRINGFIELD, MASS.

FIG. 497A. Educational Unit.

FIG. 498. Kitchenette.

NURSES' RESIDENCE, SPRINGFIELD HOSPITAL, SPRINGFIELD, MASS.

FIG. 498A. Supervisor's Room.

FIG. 498B. Library.

NURSES' RESIDENCE, SPRINGFIELD HOSPITAL, SPRINGFIELD, MASS.

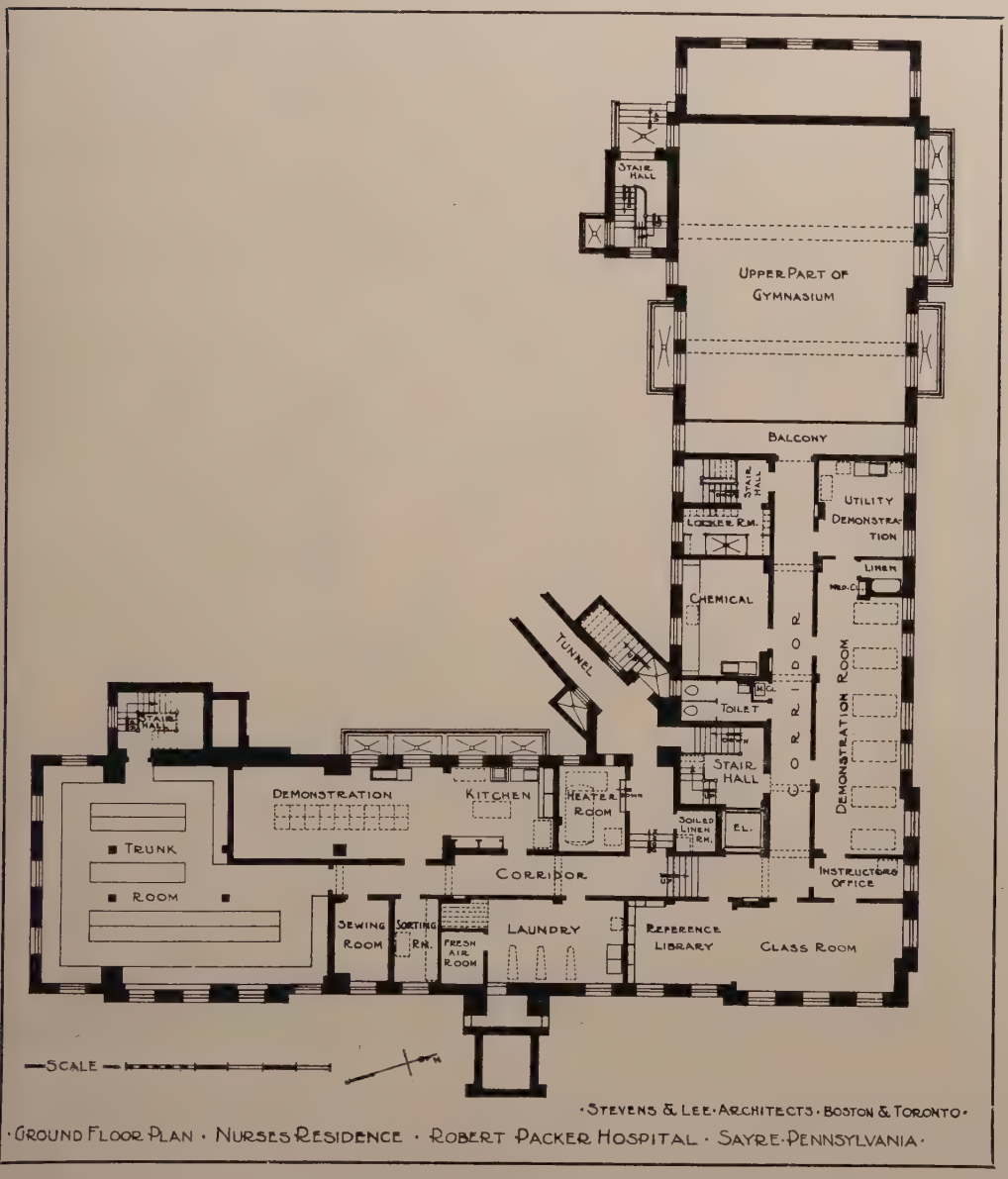

STAIR HALL
UPPER PART OF GYMNASIUM
BALCONY
STAIR HALL
LOCKER RM.
UTILITY DEMONSTRATION
LINEN
MED. CL.
CHEMICAL
TUNNEL
CORRIDOR
TOILET
STAIR HALL
DEMONSTRATION ROOM
STAIR HALL
DEMONSTRATION
KITCHEN
HEATER ROOM
SOILED LINEN RM.
EL.
TRUNK ROOM
CORRIDOR
INSTRUCTORS OFFICE
SEWING ROOM
SORTING RM.
FRESH AIR ROOM
LAUNDRY
REFERENCE LIBRARY
CLASS ROOM
SCALE
·STEVENS & LEE·ARCHITECTS·BOSTON & TORONTO·
·GROUND FLOOR PLAN · NURSES RESIDENCE · ROBERT PACKER HOSPITAL · SAYRE·PENNSYLVANIA·

FIG. 499.

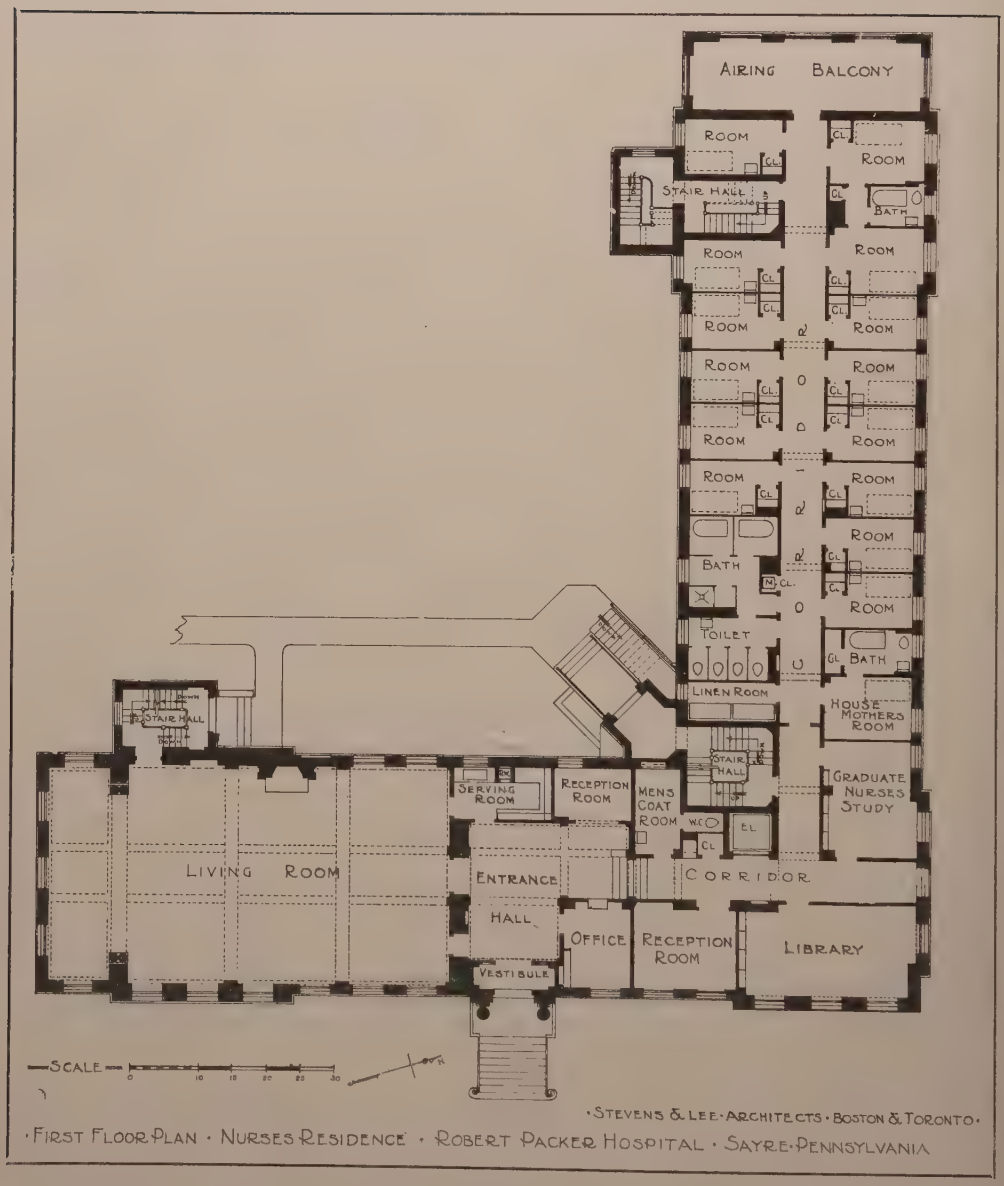

AIRING BALCONY
ROOM
STAIR HALL
BATH
TOILET
LINEN ROOM
HOUSE MOTHERS ROOM
GRADUATE NURSES STUDY
SERVING ROOM
RECEPTION ROOM
MENS COAT ROOM
LIVING ROOM
ENTRANCE HALL
OFFICE
VESTIBULE
CORRIDOR
LIBRARY
SCALE
STEVENS & LEE · ARCHITECTS · BOSTON & TORONTO
FIRST FLOOR PLAN · NURSES RESIDENCE · ROBERT PACKER HOSPITAL · SAYRE · PENNSYLVANIA

FIG. 500.

AIRING BALCONY
ROOM
BATH
STAIR HALL
ROOF
CORRIDOR
TOILET
LINEN ROOM
CLOS.
EL.
SITTING ROOM
DIRECTRESS OF NURSES' ROOM
NURSES SITTING ROOM
KITCHENETTE
SCALE
·STEVENS & LEE·ARCHITECTS·BOSTON & TORONTO·
·TYPICAL FLOOR PLAN·NURSES RESIDENCE · ROBERT PACKER HOSPITAL · SAYRE·PENNSYLVANIA·

FIG. 501.

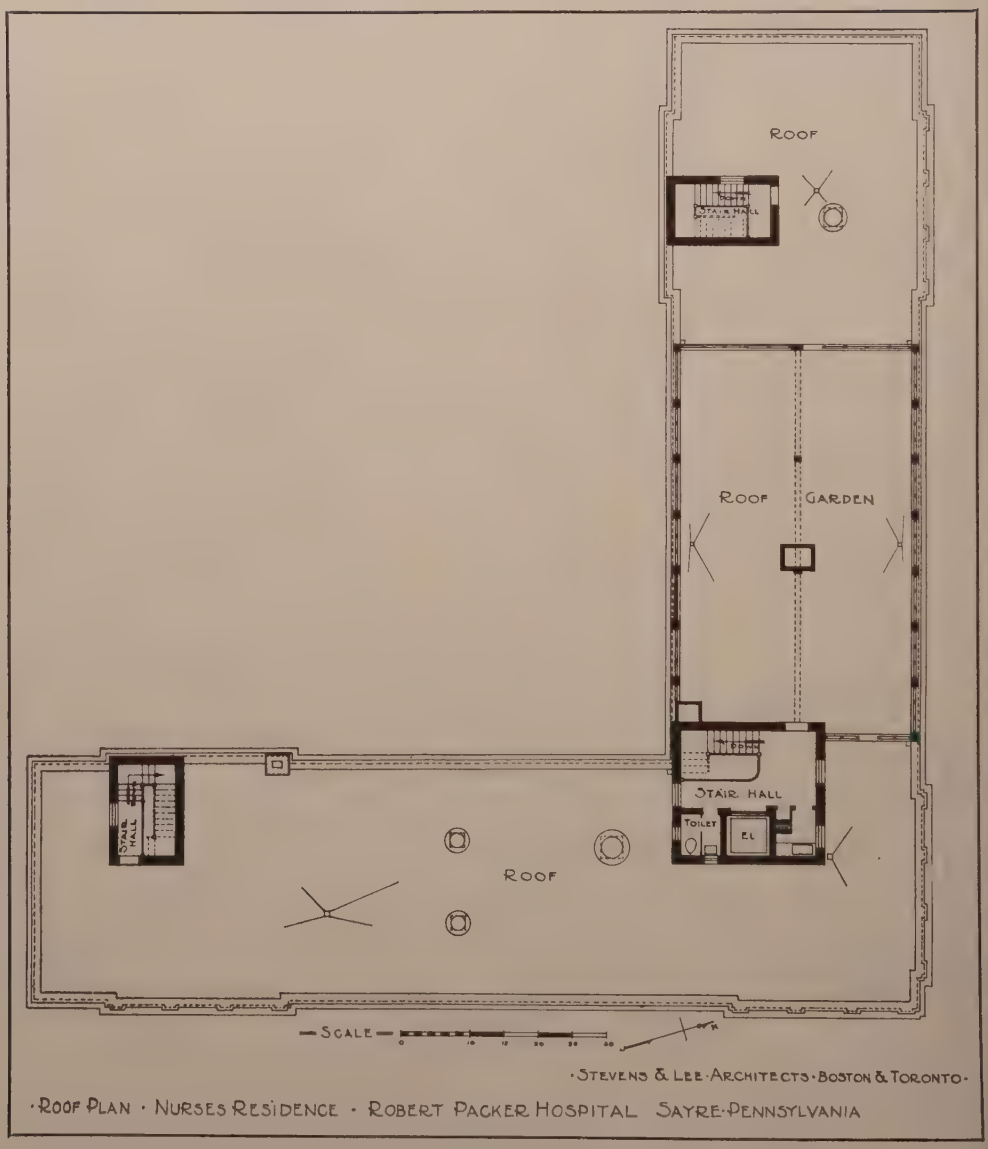

ROOF
STAIR HALL
ROOF GARDEN
STAIR HALL
TOILET
EL
STAIR HALL
ROOF
SCALE
STEVENS & LEE · ARCHITECTS · BOSTON & TORONTO
ROOF PLAN · NURSES RESIDENCE · ROBERT PACKER HOSPITAL SAYRE · PENNSYLVANIA

FIG. 502.

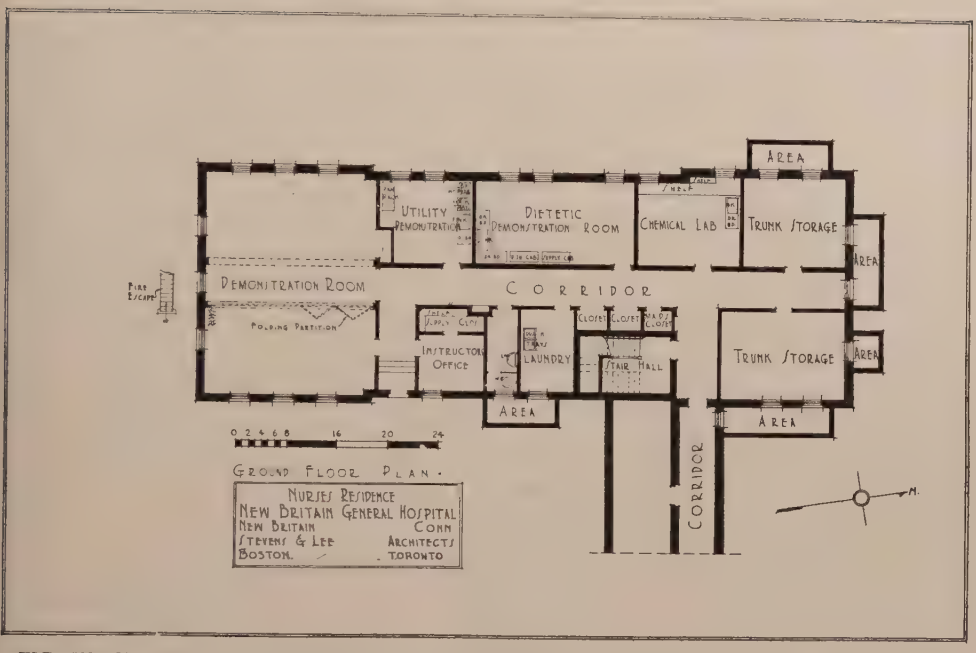



FIG. 503. NURSES' RESIDENCE, NEW BRITAIN GENERAL HOSPITAL, NEW BRITAIN, CONN.

each seven nurses, and a toilet for each six. A special section of the building is set apart for night nurses.

The nurses' residence of the MASSACHUSETTS STATE INFIRMARY (Figs. 489-491) is a U-shaped building with entrances at the angles. It has all single rooms, thirty of which can be used as sleeping porches. There is in addition an open sleeping porch on the third floor. Four large sitting rooms are provided.

While all hospital buildings should be fireproof for the safety of the helpless patients, it is sometimes possible to give the maximum amount of convenience at a minimum cost by making this section of the institution non-fireproof. This was done in the nurses' residence of ST. LUKE'S HOSPITAL (Figs. 511-513) at Jacksonville. This was built at a very low cost, owing to its simple lines, being planned on a nine-foot unit system, so that all partitions and piping came in verticals, one above the other. All the necessary rooms were provided for the comfort and pleasure of the nurses, including a broad roof balcony for sleeping. The outer finish of this building is the same as the others of the group, which are fireproof.

The plan shown for the nurses' residence at the SPRINGFIELD HOSPITAL, Springfield, Massachusetts (Figs 492-498B), is an addition to and adjoins a previously existing building. The ground floor contains

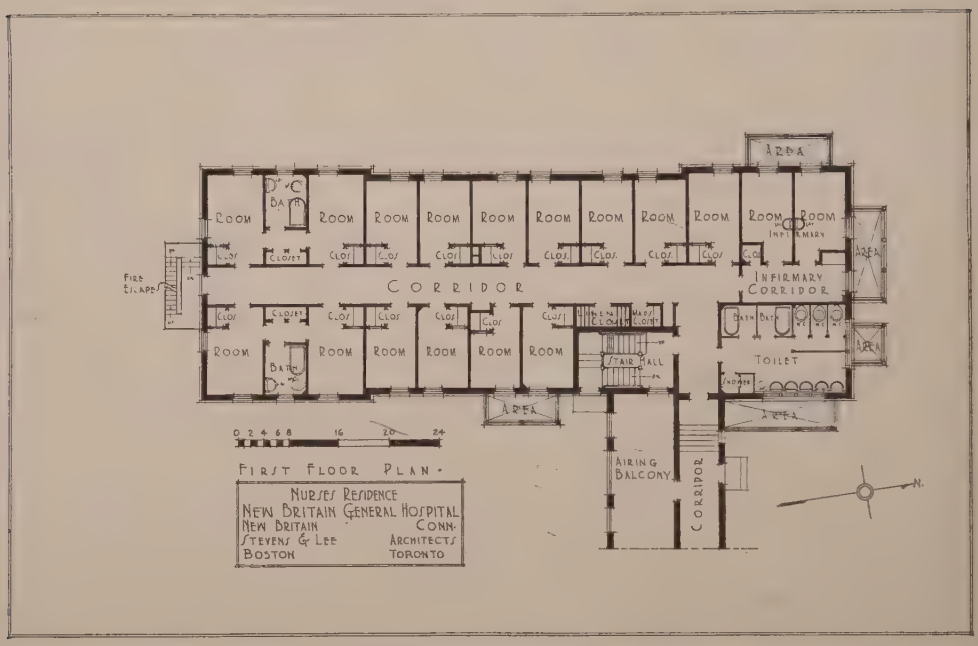



FIG. 504. NURSES' RESIDENCE, NEW BRITAIN GENERAL HOSPITAL, NEW BRITAIN, CONN.

an educational unit, with large demonstration room, typical utility room, chemical and diet laboratories, an instructor's office and a study room; there is also a trunk room and a laundry. The first floor has a large lecture hall, library, reception room, office, tea kitchen, coat-room, a suite for the superintendent and for guests; it is readily accessible to additional classrooms in the old building. The second, third and fourth floors are divided into single rooms, with a lavatory and an ample closet in each. There are suites with bath for supervisors, sleeping porches and infirmary, and a special section for night nurses. It will be seen that this building accords with all modern standards.

In the plan of the nurses' residence of the ROBERT PACKER HOSPITAL (Figs. 499-502), the teaching department is emphasized, as well as the social. Nearly the entire ground floor is occupied by the teaching rooms. The teaching "ward" provides room for six beds, is fully equipped, and has a utility and linen room. A "full sized" gymnasium affords recreation possibilities. The laboratories, chemical and dietetic, are fully equipped.

The common room on the first floor is of sufficient size for festivities and there is a special storage room connecting with the dietetic laboratory below. The night nurses are not forgotten, as there is a separate section set aside for them.

FIG. 505.

GROUND FLOOR

FIG. 506.

FIRST FLOOR

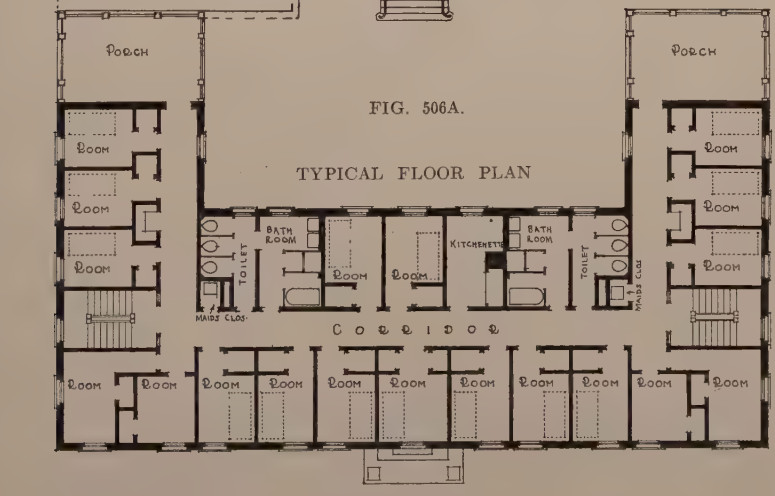



FIG. 506A.

TYPICAL FLOOR PLAN

NURSES' RESIDENCE, NASHUA MEMORIAL HOSPITAL, NASHUA, N. H.
Stevens & Lee, Architects

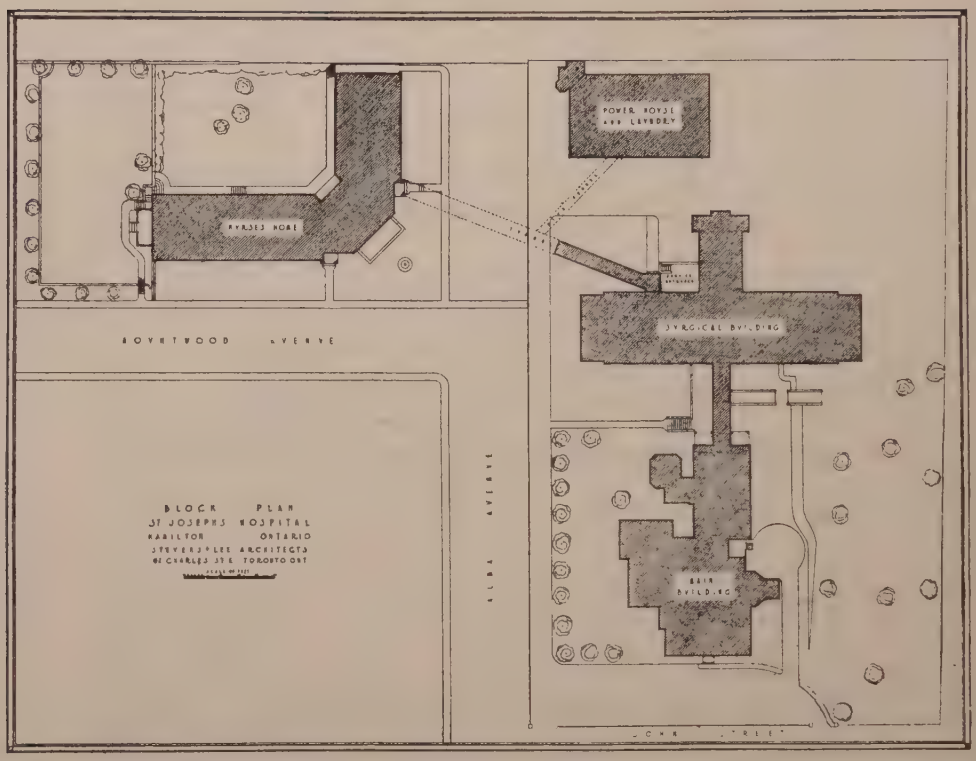



FIG. 507. PLOT PLAN, ST. JOSEPH'S HOSPITAL, HAMILTON, ONT.

The superintendent of nurses, the dietitian and the house mother have special suites.

A tunnel leads to the hospital.

The nurses' home of the NEW BRITAIN GENERAL HOSPITAL, New Britain, Connecticut (Figs. 503 and 504), houses fifty nurses. On the ground floor is a large demonstration room with utility room, instructor's office, chemical and dietetic laboratories, also a trunk room and a laundry. The nurses have separate rooms; on the first floor is an infirmary with two beds; there are tea kitchens on the second and third, and two suites for supervisors on each floor; the balconies are large. The reception rooms are in an adjoining building.

The nurses' residence for the NASHUA MEMORIAL HOSPITAL, Nashua, New Hampshire (Figs. 505, 506, 506A), provides for fifty nurses. There is a large reception room, a library and a sitting-room for supervisors. On the ground floor is a large recreation room with platform, class and demonstration rooms, laboratory and diet kitchen, laundry, trunk and sewing rooms. The second and third floors are

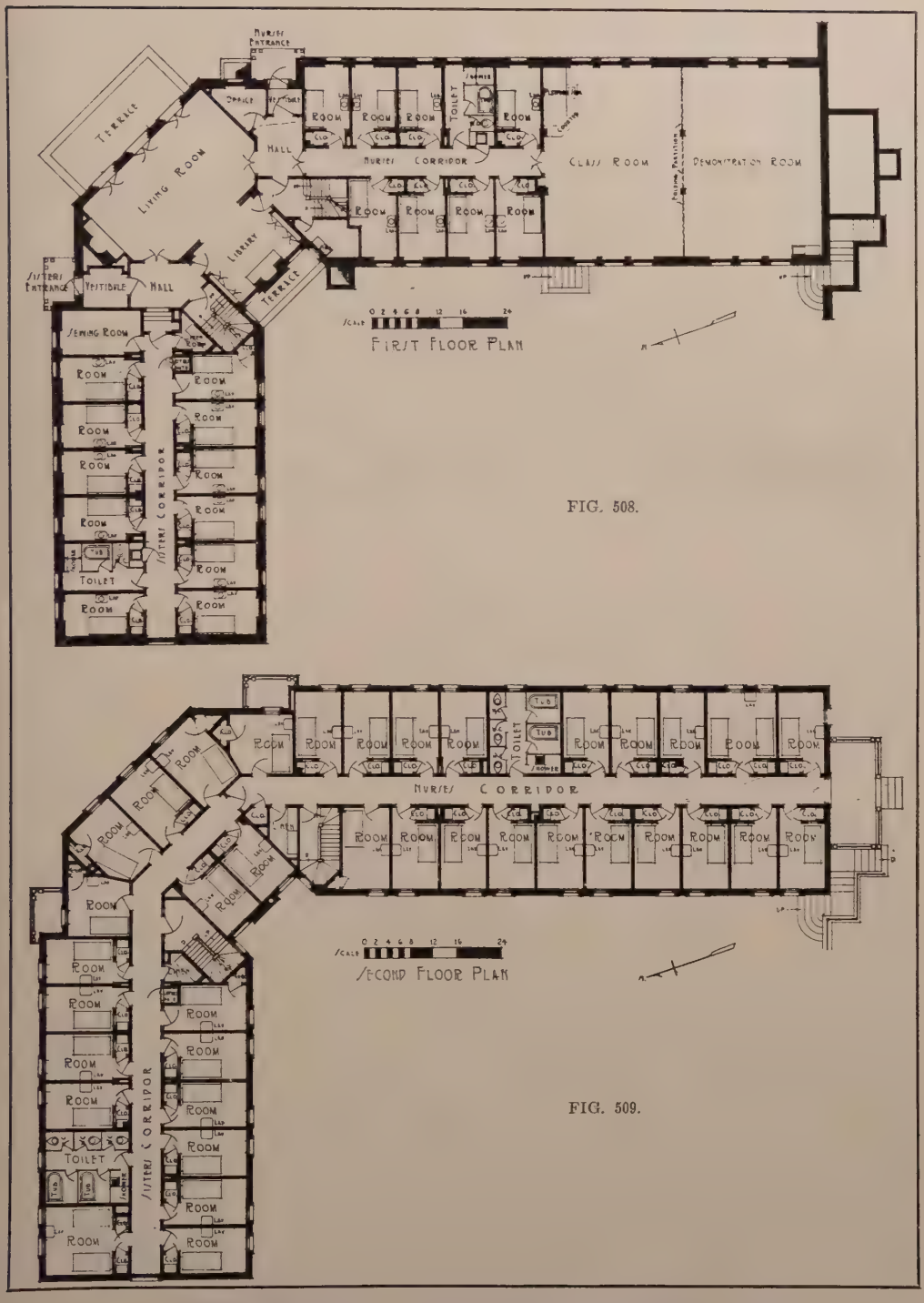



FIG. 508.




FIG. 509.

NURSES' RESIDENCE. ST. JOSEPH'S HOSPITAL, HAMILTON, ONT.

FIG. 510. EXTERIOR, NURSES' RESIDENCE, ST. JOSEPH'S HOSPITAL, HAMILTON, ONT.
Stevens & Lee, Architects

divided into single bedrooms, each with a lavatory; a kitchenette is provided, a special section for night nurses, and there are large porches.

The plot plan of St. Joseph's Hospital, Hamilton, Ontario (Fig. 507), shows the relation of the nurses' residence to the other buildings, with which it is connected by a tunnel, for use in severe weather. It is an L-shaped building, and by unique planning has arranged separate entrances for Sisters and nurses (Figs. 508-510). There is a beautiful living-room and a library, large class and demonstration rooms. All Sisters and nurses have single bedrooms, each with a lavatory and large cupboard. It houses about 95 nurses.

In the case of the nurses' home for the Good Samaritan Hospital at Cincinnati (Figs. 516-517B), the problem is solved in a slightly different manner. The waiting-rooms and parlors are made flexible with sliding partitions so as to serve for private waiting-rooms when not needed as a whole unit. In this plan the nurses have their dining-room in the home, a condition which some authorities feel should be carried out.

As with the Mount Sinai Hospital (Fig. 525), the teaching rooms are on the second floor. The typical floor plan (Fig. 526) shows individual rooms of the minimum size, with ample provision for toilets and baths. It is noticeable that the tub bath is dispensed

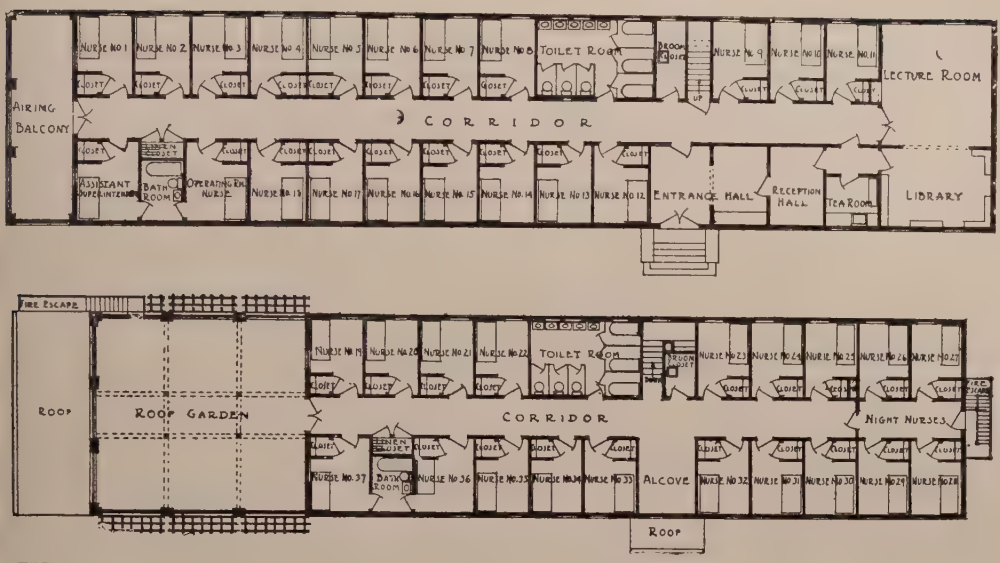



FIG. 511. NURSES' RESIDENCE, ST. LUKE'S HOSPITAL, JACKSONVILLE, FLORIDA. FLOOR PLANS.
Edward F. Stevens, Architect.

FIG. 512. NURSES' RESIDENCE, ST. LUKE'S HOSPITAL, JACKSONVILLE, FLORIDA.

FIG. 513. SLEEPING PORCH, NURSES' RESIDENCE, ST. LUKE'S HOSPITAL, JACKSONVILLE, FLORIDA.

with for general use. The exterior shows a simple but dignified treatment.

The plans for the nurses' residence of the LEONARD MORSE HOSPITAL are shown in Fig. 514, 515.

Internes' quarters should be similar to nurses' residences. Internes are college men, and should have proper bedrooms and living-rooms, sufficiently removed from the patients not to disturb or be disturbed.

In the PROVIDENCE LYING-IN HOSPITAL, Providence, Rhode Island (Fig. 215), provision is made for five men, close to the delivery department, yet in a separate wing.

In the OTTAWA CIVIC HOSPITAL, Ottawa, Canada (Fig. 87), the top floor of the service building is fitted up for twenty-three internes. It has a direct connection with the main hospital. There is a suite for the superintendent, a library, a large living-room, ample baths, trunk and linen rooms. There is a solarium on the roof.

In the VICTORIA GENERAL HOSPITAL, Halifax, a similar arrangement is made, fourteen internes being housed on the third floor of the service building, in comfortable quarters, separate from anyone else.

In both of these buildings, the housekeeper and her assistants are housed on the floor below the internes, in special suites, disconnected from the working part of the building.

For the housing of servants, the same general conditions should exist as for nurses, but some of the refinements need not be furnished,

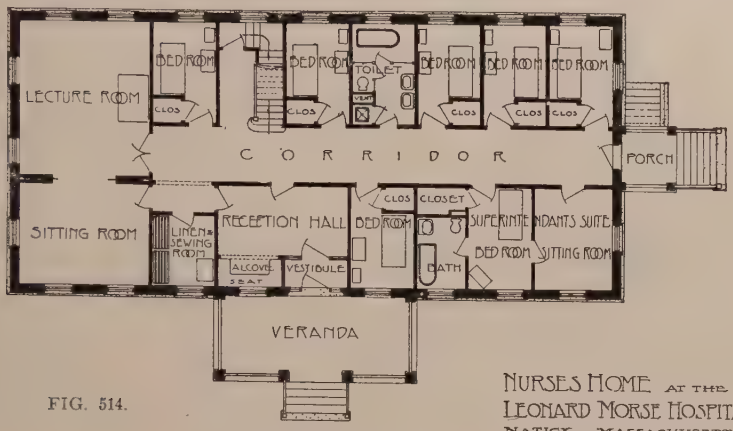



FIG. 514.

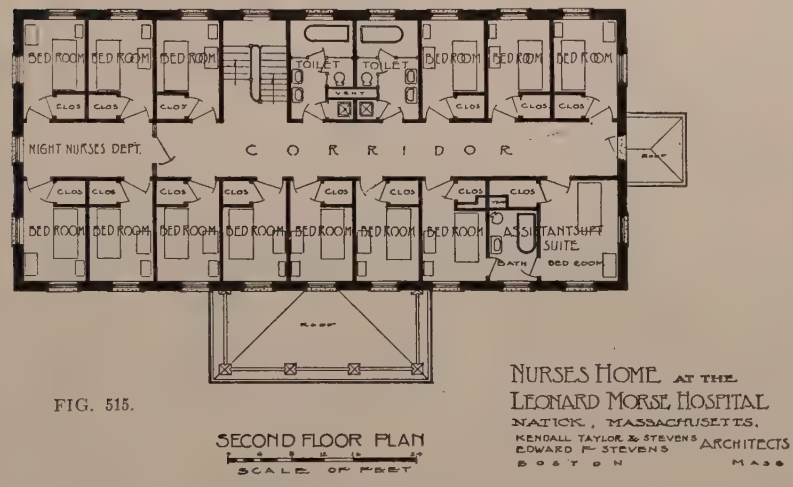
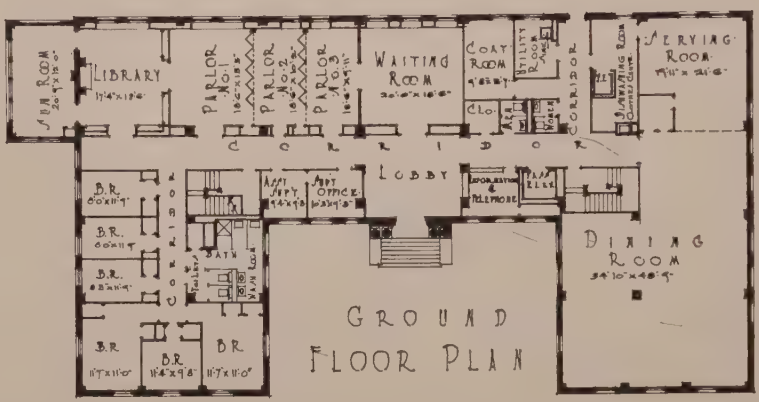



FIG. 515.

though single rooms should usually be provided. In smaller institutions, a portion of the nurses' residence may be used for maids.

At the Ottawa Civic Hospital, Ottawa, Canada (Fig. 518), there is a separate building for seventy-two female help. It has single rooms and recreational facilities.

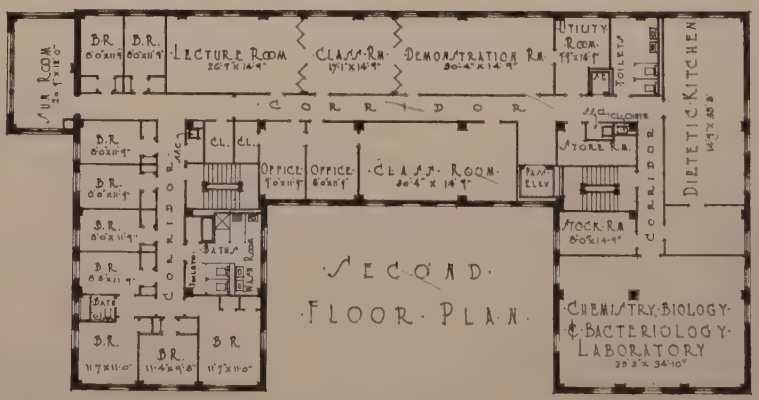
An example of a help's building on economical lines is that designed for Kings County Hospital, New York (Figs. 520, 521,




NURSES' HOME
FOR THE
GOOD SAMARIAN HOSPITAL
CINCINNATI OHIO

GUSTAVE W. DRACH ARCH'T.
CINCINNATI, OHIO

FIG. 516




NURSES' HOME
FOR THE
GOOD SAMARITAN HOSPITAL
CINCINNATI OHIO.

GUSTAVE W. DRACH ARCH'T.
CINCINNATI, OHIO.

FIG. 517.

NURSES HOME
FOR THE
GOOD SAMARITAN HOSPITAL
CINCINNATI OHIO.

FIG. 517A. GUSTAVE W. DRACH ARCHT.
CINCINNATI OHIO.

FIG. 517B. EXTERIOR, NURSES' RESIDENCE, GOOD SAMARITAN HOSPITAL, CINCINNATI, OHIO

FIG. 518. FEMALE HELP BUILDING, OTTAWA CIVIC HOSPITAL, OTTAWA, CANADA.

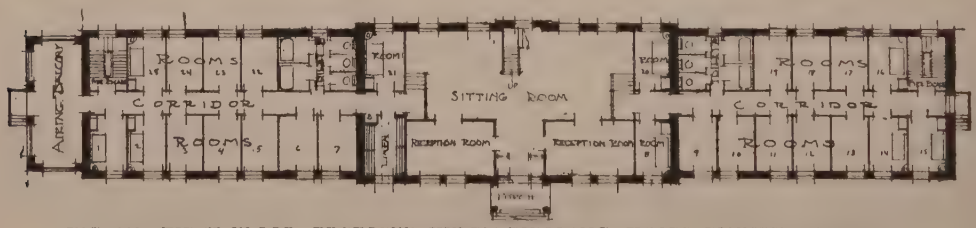



FIG. 520, FIRST FLOOR, PROPOSED HELP'S BUILDING, KINGS COUNTY HOSPITAL, NEW YORK, N. Y.

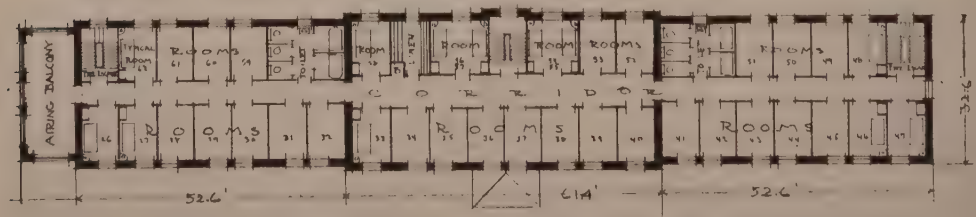



FIG. 521. SECOND AND THIRD FLOORS, PROPOSED HELP'S BUILDING, KINGS COUNTY HOSPITAL, NEW YORK, N. Y.

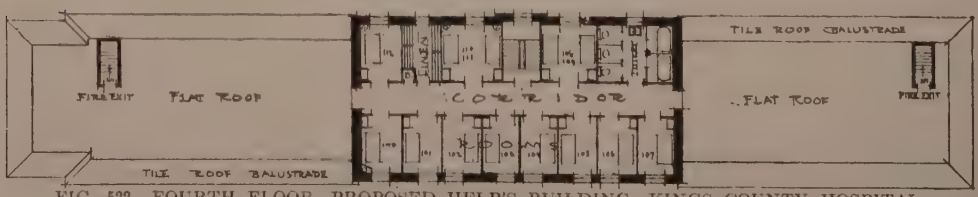



FIG. 522. FOURTH FLOOR, PROPOSED HELP'S BUILDING, KINGS COUNTY HOSPITAL, NEW YORK, N. Y.

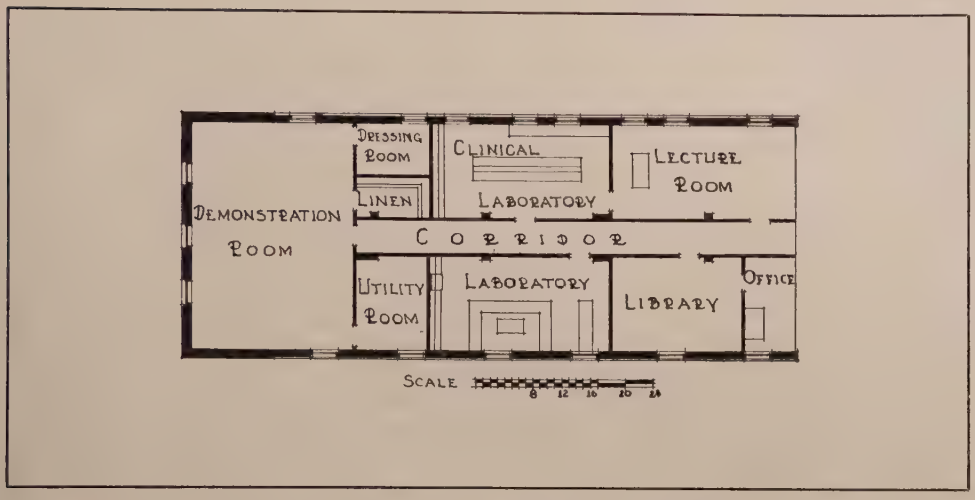



FIG. 523. SUGGESTED PLAN FOR EDUCATIONAL BUILDING, NEW YORK STATE BOARD OF NURSE EXAMINERS

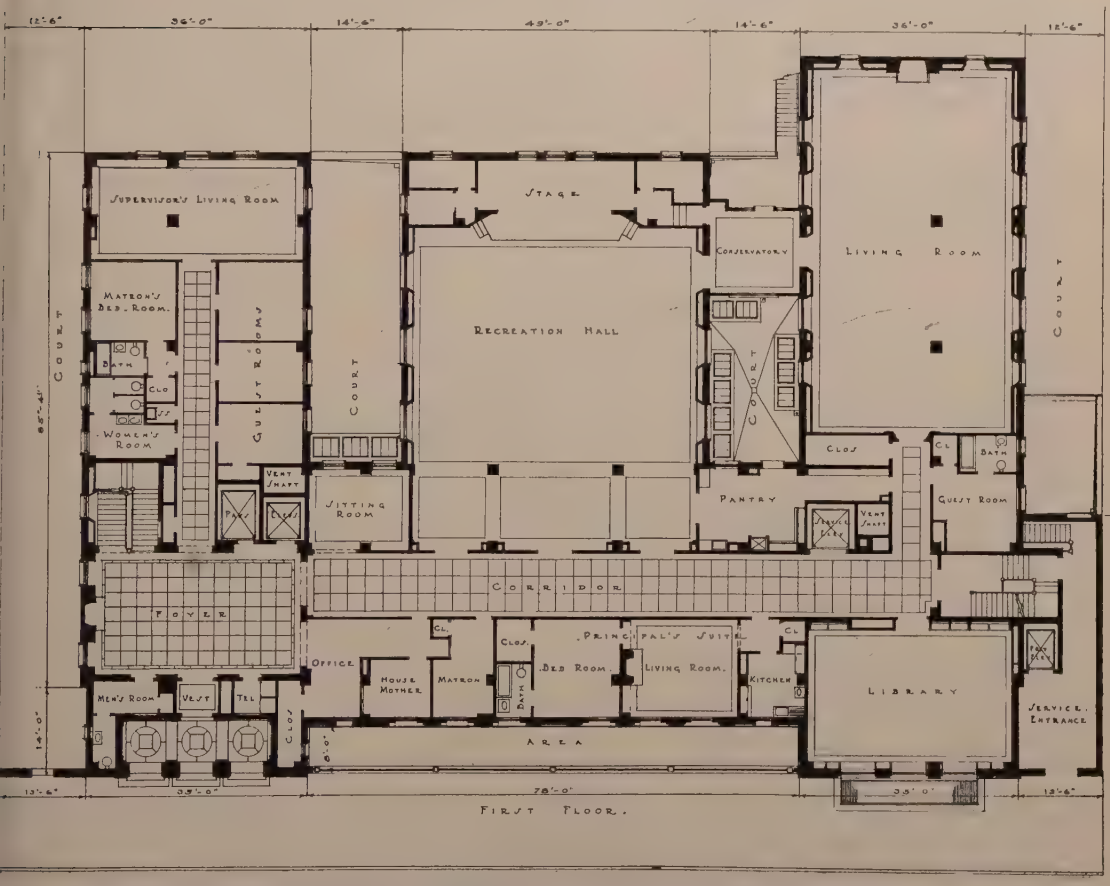



FIG. 524. NURSES' RESIDENCE, MT. SINAI HOSPITAL, NEW YORK
Charles Butler & Robert Kohn, Architects; S. S. Goldwater, M. D., Medical Consultant

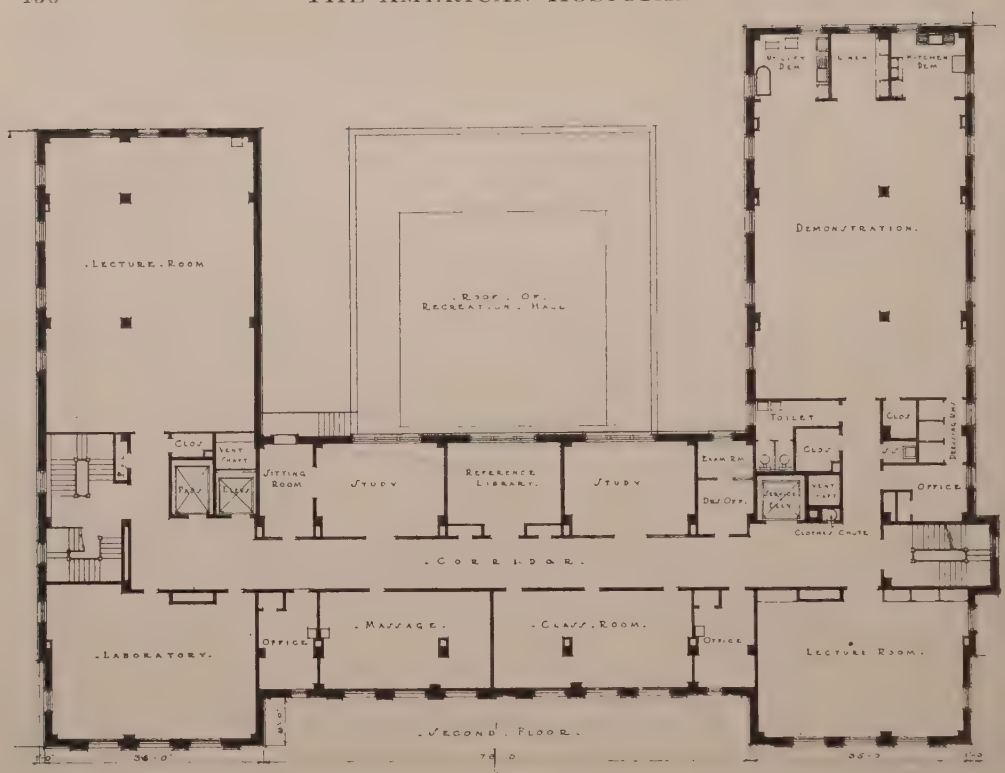



FIG. 525. SECOND FLOOR.

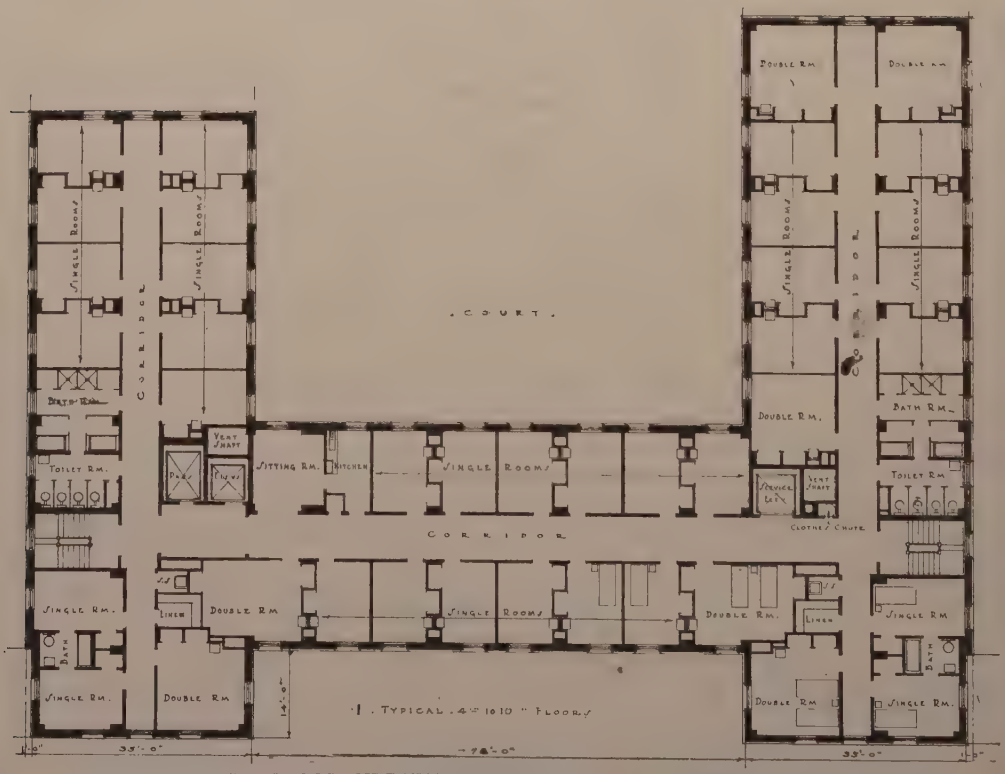
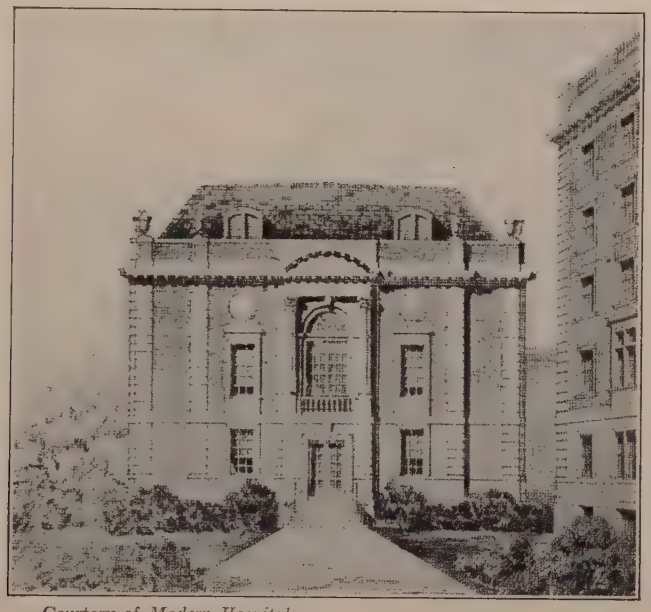



FIG. 526. TYPICAL FLOOR, NURSES' RESIDENCE, MT. SINAI HOSPITAL, NEW YORK.
Charles Butler & Robert Kohn, Architects; S. S. Goldwater, M. D., Medical Consultant

522). This is planned on an eight-foot unit basis. It has all necessary common rooms, staircases, toilets, etc.

### EDUCATIONAL BUILDINGS OR DEPARTMENTS

The present-day demands for the housing of nurses are no longer merely for a home where the student nurse may sleep or receive visitors when off duty, but there must be included a complete school for teaching every branch of nursing. Preliminary courses are the rule, and for giving these there must be provided properly designed demonstration rooms, equipped with the devices used in the hospital, such as utilities for utensil cleansing and storage, tray service, bed making, handling of the sick and other matters of nursing technique.

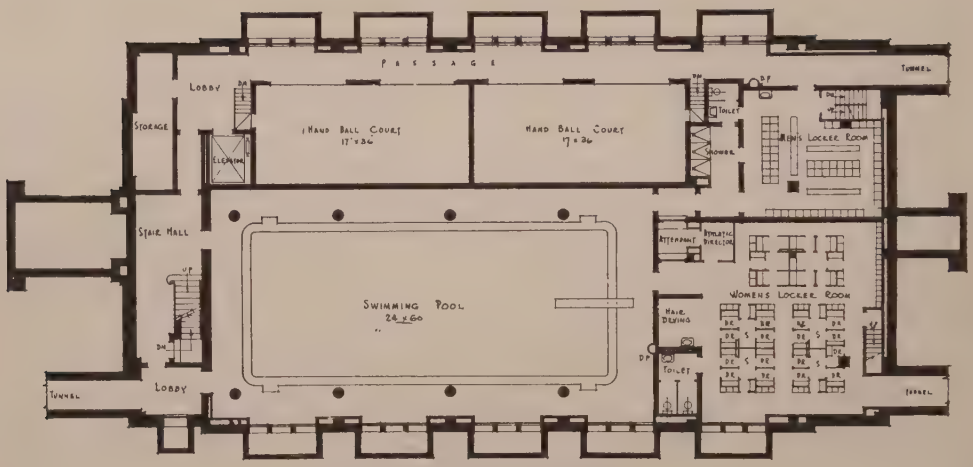


Courtesy of *Modern Hospital*

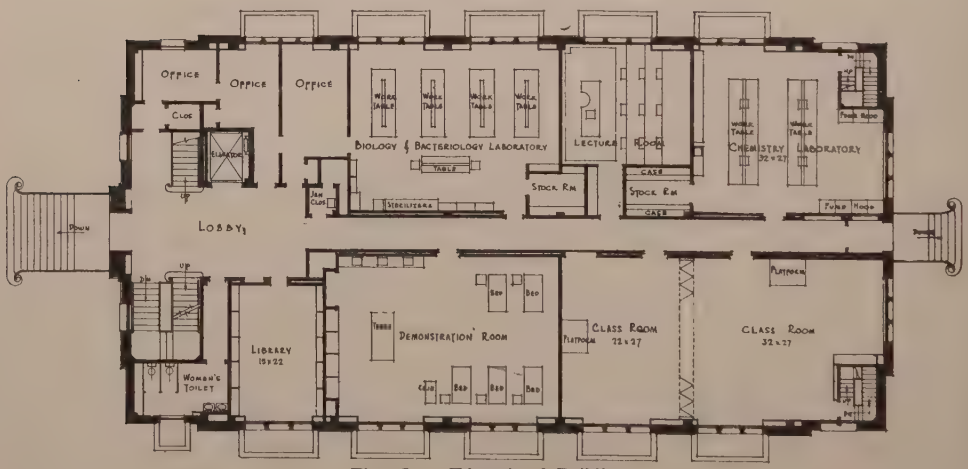
FIG. 527. EDUCATIONAL BUILDING, HENRY FORD HOSPITAL, DETROIT, MICH.

The size and equipment of these rooms must depend, naturally, on the size of the school. These may be provided in a separate building or in the residence. The following are now considered essential:

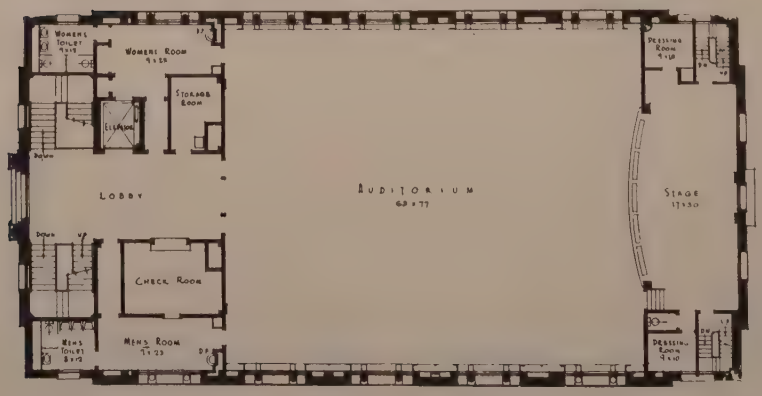
A demonstration room large enough for the equipment of a two-bed ward, or more, where a whole nursing program may be carried out, with plenty of space about each bed for demonstrating all procedures. There should be shown a nurses' call identical with those used in the hospital, a nurses' charting desk, etc.




Ground floor, Educational Building
FIG. 528.




First floor, Educational Building
FIG. 529.




Courtesy of *Hospital Management*
Second floor, Educational Building
FIG. 530.

FLOOR PLANS, EDUCATIONAL BUILDING, HENRY FORD HOSPITAL, DETROIT, MICH.

A utility and service room, where are placed the actual working fixtures, such as bed-pan hopper, sterilizers, sink, and gas plate, where the practical use and care of these fixtures can be taught.

A laboratory for the teaching of chemistry and bacteriology, where sufficient apparatus may be set up for all the necessary experiments to be made by individual students; there should be cupboard for the storage of apparatus and chemicals.

A dietetic laboratory, providing this teaching is not done in the main diet kitchen. It is the writer's belief that this is better done in the educational department, leaving the working kitchen free for its own purposes.

Fig. 523 shows a plan suggested by the New York State Board of Nurse Examiners for an educational building or department.

In the new nurses' home for the Mount Sinai Hospital (Figs. 524, 525, 526), the teaching rooms are placed on the second floor, above the recreation rooms, consisting of two large lecture rooms, a demonstration room, and numerous class and study rooms, as well as laboratory and reference library.

On the first or entrance floor are the social rooms. The one entrance is controlled from the office. On this floor are located the recreation room and the nurses' living-room, also the living-room of the supervisor and house mother.

The fourth to the tenth floors are nurses' rooms, forty on each floor, making provision for two hundred and fifty nurses.

The storeroom and trunk room are in the basement.

In the educational building of the Henry Ford Hospital, Detroit (Figs. 527, 528, 529, 530), the ground floor and the third floor are occupied by recreational facilities, a swimming pool, ball courts, etc. On the first floor are three offices, a library, a large demonstration room, three classrooms, two laboratories and a stockroom. The second floor is occupied by an auditorium with stage and dressing-rooms, check and retiring rooms.

Attention is called to the educational departments of the nurses' residences of the Springfield Hospital, Springfield, Massachusetts (Fig. 493), the Robert Packer Hospital, Sayre, Pennsylvania (Fig. 499), and the New Britain General Hospital, New Britain, Connecticut (Fig. 503).

# CHAPTER XVII

## THE SERVICE BUILDING—KITCHEN—LAUNDRY

IN larger medical institutions, it is often found to be advantageous planning to combine the mechanical features of the institution, such as heating, laundry, and kitchen, in one building, and for want of a better name we term it the service building. If this building contains the kitchen, it should naturally be in close proximity to the main hospital group, connected by a corridor. The reason for separation is to minimize the noises and vibrations which come from the mechanical equipment of the heating plant, the laundry and the kitchen. It is often advantageous to use the upper stories of this building for the housing of male or female help, of the main linen storage, and the housekeeper's office. It allows the delivery of merchandise outside the patients' area, thus minimizing the noises from this class of traffic.

In such a building would naturally be located the central storerooms, both for cold storage and dry storage.

The service entrance of the hospital should be in close connection with the kitchen, and through this entrance all supplies should come. The storekeeper's office should be here, so located as to supervise every sort of material brought to the institution. This entrance should be in close connection with all storerooms and near the entrance to the cold storage department. It should be broad, well protected against damage from barrels and boxes, and protected against the entrance of insects, such as flies and mosquitoes, by the use of fans placed in the ceiling of the entrance.

The disposal of garbage as well as waste material of the hospital may well be considered in this chapter. With most institutions the garbage is taken care of by farmers at a distance and can only be removed at regular intervals; the protection of this garbage in the interim is rather an important feature. If allowed to accumulate in an open shed or room it very quickly becomes offensive, so that it seems an advantage to an institution to place in connection with the cold storage system a garbage room, where this waste material may be kept from deteriorating for days, if necessary, until taken away by the garbage wagon. If such an arrangement can be made with an exit on the outside of the building, little or no disturbance or unpleasant odors would arise from the moving of the garbage from the building to the wagon.

For the destruction of such refuse as would not be termed garbage, some sort of an incinerator plant should be provided. This may be advantageously placed in connection with the heating plant and a built-in incinerator, either directly from a garbage room or out of doors, in some convenient place adjacent to the heating chimney, and which can be fed from above, can be used to advantage. The local incinerators placed throughout the institution are often found a satisfactory solution of this problem, but the prevailing idea at present seems to be to make one point for the destruction of this waste material.

FIG. 532. SERVICE BUILDING, QUINCY CITY HOSPITAL, QUINCY, MASS.

The location and plan of the kitchen building, so-called, are most important factors in the success or failure of an institution.

Hotel conditions do not exist in hospitals, and kitchen planning must not follow hotel methods too closely.

The kitchen, whether an isolated building or a department in a general building, should be so located that food—hot, palatable food—can be readily transported, with the least delay and the least amount of handling, from the place where it is cooked to the patient's tray or dining table. To do this, certain conditions must exist—

FIG. 532A. EXTERIOR SERVICE BUILDING, QUINCY, CITY HOSPITAL, QUINCY, MASS.
Stevens & Lee, Architects

(a) A central location.

(b) Adequate means of transporting.

(c) Serving kitchens of sufficient size and equipment to care for and distribute food properly.

If occupying only a portion of the building, the kitchen should be on the ground floor or on the highest floor. Many of our best hospital superintendents contend that the kitchen should be on the upper level, while others agree that, owing to a greater facility for delivery of supplies, the lower basement level is the more economical. With a refrigerating system and good elevator service, the upper level kitchen has certain advantages, the chief being the freedom from odors of cooking and the exclusion of tradesmen from the kitchen. On the other hand, the low-level kitchen affords quicker delivery of supplies, quicker disposal of waste products, and, as the heavier demand is apt to be on the lower floors, quicker service to the greatest number of patients.

The kitchen should not be too large or too small. If too large, time is wasted, owing to the distance traveled; if too small, it will be too crowded to secure the best results. In other words, the kitchen should be planned to meet the needs of the institution, not forgetting, however, its probable growth.

One of the important items in the kitchen is good ventilation. Oftentimes the benefit of good planning has been more or less nullified because of the lack of ventilation; the intense heat given off by the ranges and steam cookers requires more than ordinary ventilation.

The walls should be of some material very easily cleaned. The

FIG. 533. SERVICE BUILDING, QUINCY CITY HOSPITAL, QUINCY, MASS.

cooking apparatus is always giving off steam, more or less greasy steam, and unless the walls are impervious to that, it is difficult to keep the kitchen sweet and odorless.

## GENERAL PLAN

The hospital kitchen should be planned like a modern factory—that is, to receive the raw material and to deliver the finished product (which is palatable food) with as few lost motions and delays as would be expected by a modern manufacturer in his factory. If there is any delay by the way, there is a loss in food value, and the patient

has in consequence less of vital energy than with efficient service. The same thing applies not only to the patient, but to the nurse, the attendant, the servant, and all along down the line. An underfed nurse or domestic cannot do her best, so that as a purely business proposition it pays to feed well everybody connected with the institution.

In the kitchen, the building should be planned around the equipment. The ranges, which are perhaps the apparatus most constantly

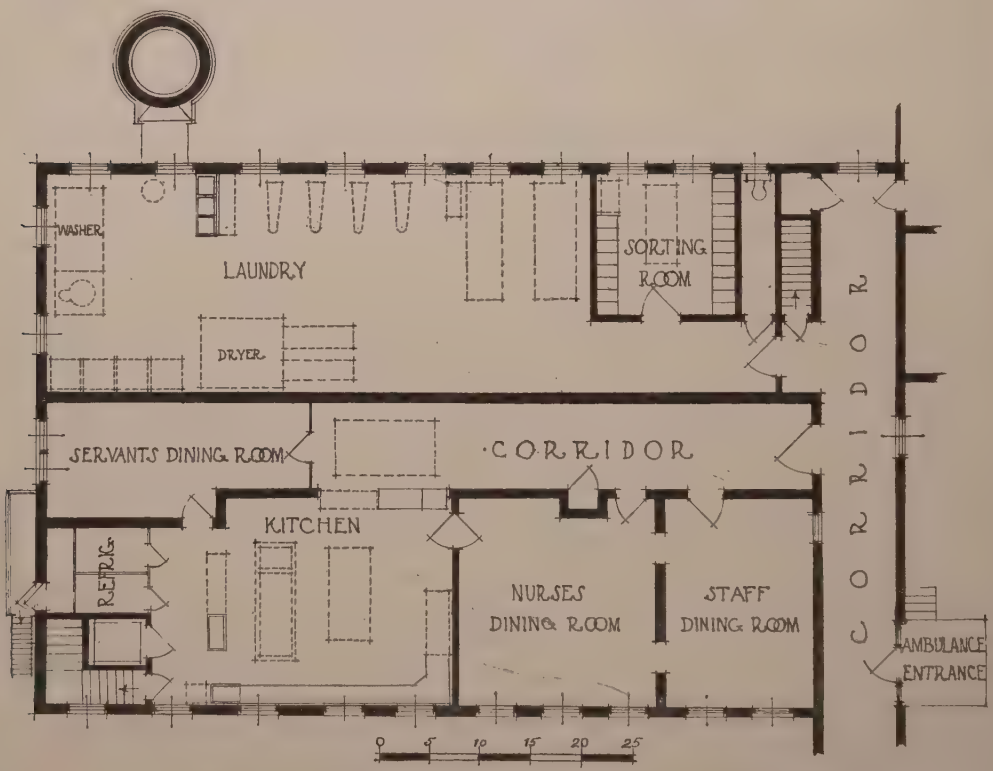



FIG. 534. SERVICE BUILDING, NEW ROCHELLE HOSPITAL, NEW ROCHELLE, N. Y.
Edward F. Stevens, Architect.

in use, should be placed in the most convenient place—generally in the center, where all sides are available.

The equipment and fixtures should be so located that the refrigerators, which hold the cold food, salads, etc., are placed so that the service comes as near to one focal point as possible; so that all food wagons or trays may, in going the shortest possible distance, pick up hot food, cold food, beverages, etc., without extra steps or loss of time.

It is the writer's opinion that in large hospitals food should be loaded upon a carriage, heated by hot soapstones, electric heaters or vacuum, and sent to the ward kitchens. The person who loads the

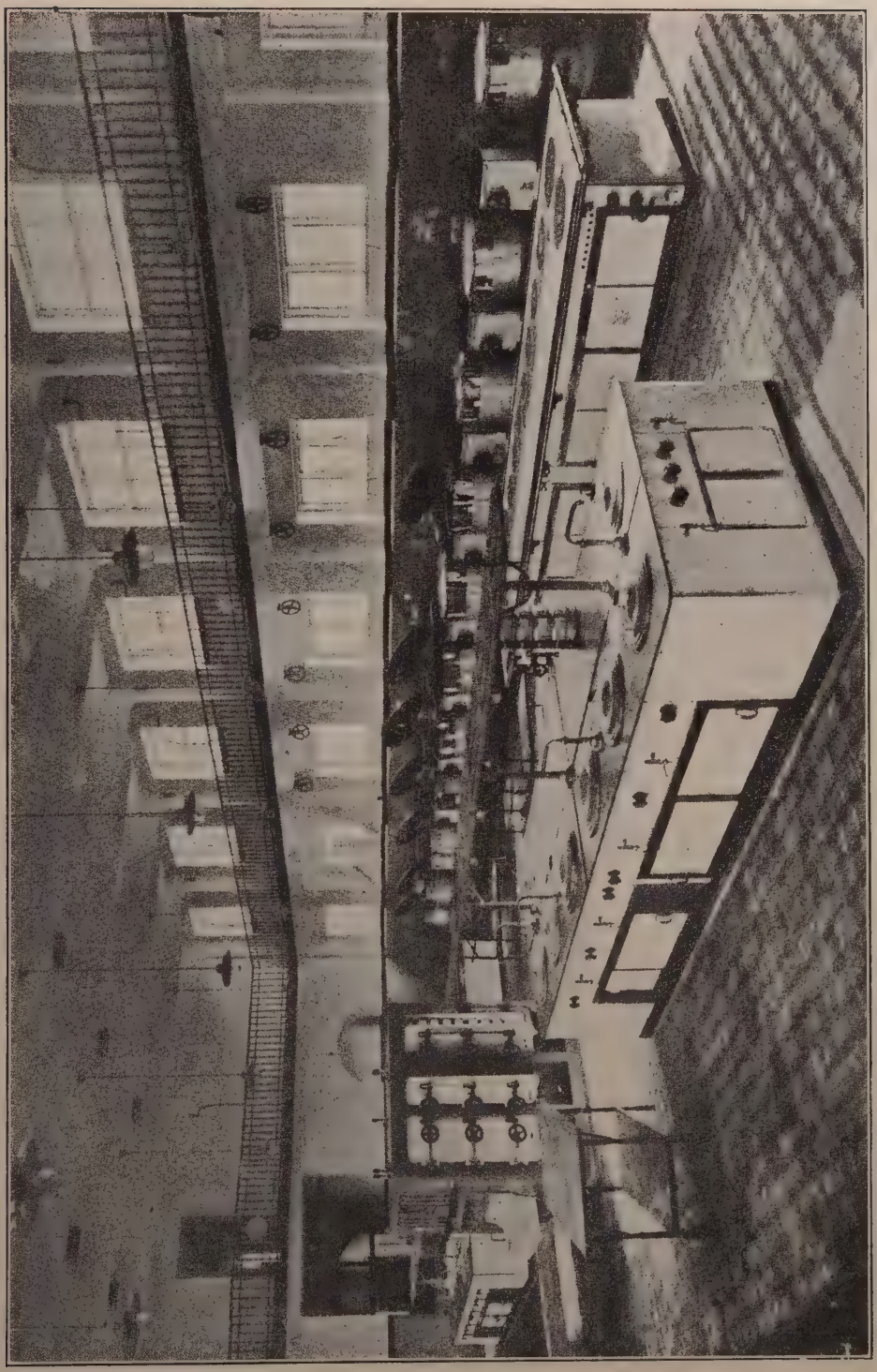


FIG. 535. KITCHEN, BISPEGJERG HOSPITAL, COPENHAGEN, DENMARK.

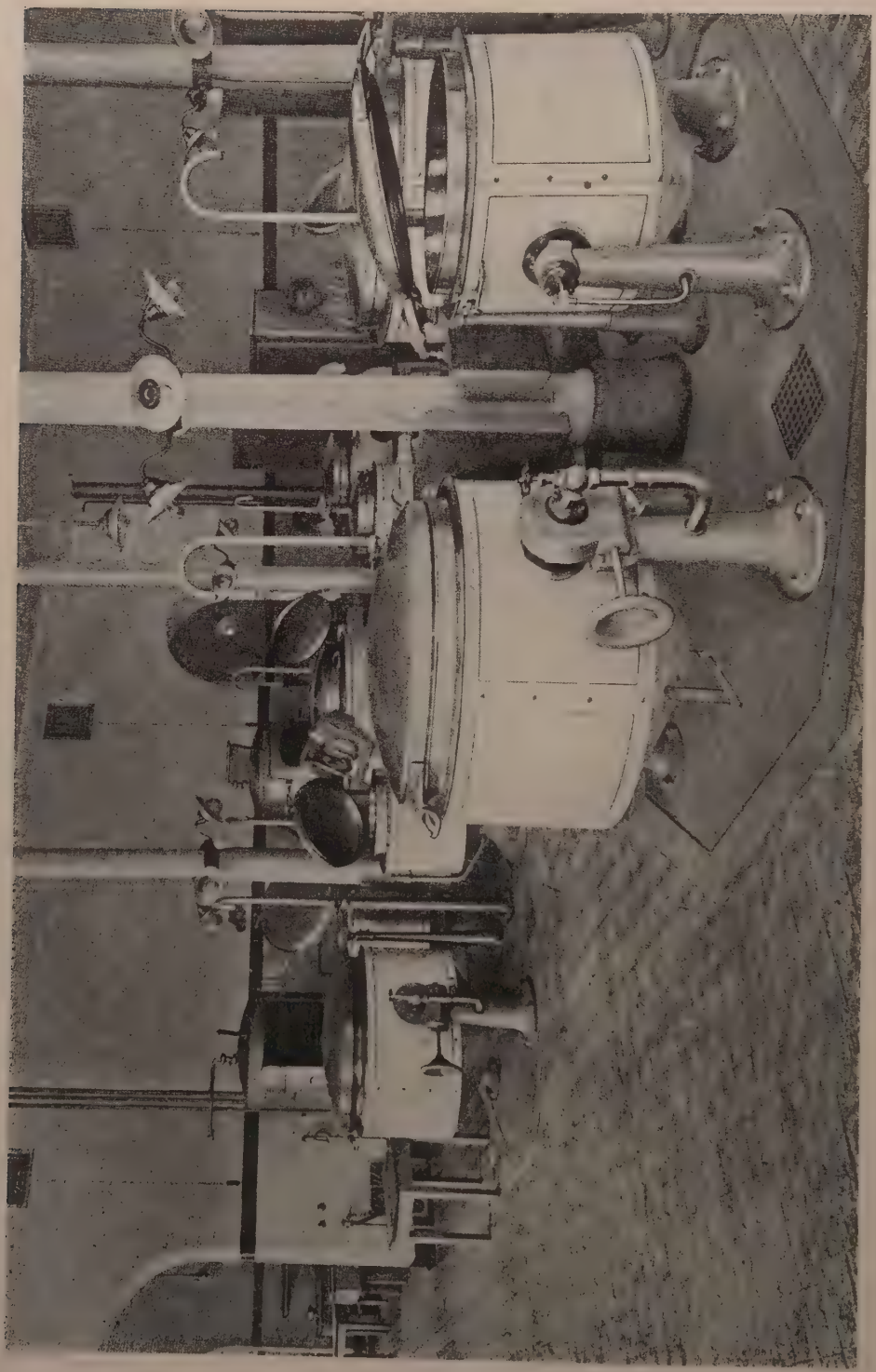


FIG. 536. KITCHEN, RIGS HOSPITAL, COPENHAGEN, DENMARK.

food should be responsible for its delivery to the point from which it is to be served.

For fuel, circumstances differ, and what is best in one part of the country may not be good in another. Gas, either natural or artificial, in the long run is not only the most economical but the most efficient. There is no dust, no dirt, no unsightly or unsanitary coal scuttle in the way. The modern blast burner ranges give the same quality of heat as the best coal range. Broilers or toasters are equally good in gas, and these should be placed on the same line and near the range. In the institutions in the West, crude oil is used both for kitchens and for heating boilers.

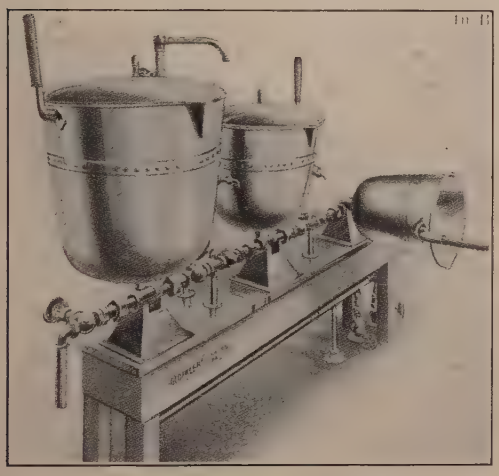


FIG. 537. TILTING KETTLES.

FIG. 538. KITCHEN DETAIL

With electricity at a minimum cost, much work can be done with that medium.

Much of the cooking formerly done on the range can now be more efficiently done by steam. In the pressure steam cooker practically all vegetables can be prepared. This cooker should be of sufficient size and of proper design to do the work easily.

The steam stock kettles as made and used in Europe are much finer in workmanship and more attractive than those made in America. American manufacturers have begun to make finer, more attractive, and more hygienic apparatus.

For the cooking of cereals, the tilting kettles are the simplest in action, being easily manipulated and cleaned (Fig. 537).

All steam apparatus should be planned to withstand a pressure

FIG. 539. KITCHEN, RUDOLPH-VIRCHOW HOSPITAL, BERLIN, GERMANY.

of at least sixty pounds per square inch. To that end, a reducing valve for the kitchen steam supply should be provided.

The kitchen sinks should be planned for their special uses—deep sinks for pots and pans, and shallow sinks for smaller utensils. Vegetable sinks can be grouped together. A small sink in the cook's table often saves steps.

The many labor-saving devices driven by the small motor, such as meat choppers, bread and cake mixers, ice-cream freezers and ice crushers, vegetable and fruit parers, and can openers, make the work of preparing food vastly easier. Power dish-washers save much time and many dishes. Steam tables have become a necessity in keeping food palatable.

All cabinets and racks should be open and easy to clean. Dish cabinets and dish warmers should be at a proper height from the floor to prevent extra muscular strain in removing the dishes.

The Cincinnati General Hospital kitchen building (Figs. 540, 541, 542) has the top-lighted kitchen in the center, with the diet kitchen at one side and the bakery at the other. The dining-rooms for officers and internes are at one side, those for servants at the other, each having its separate entrance. The food service for the

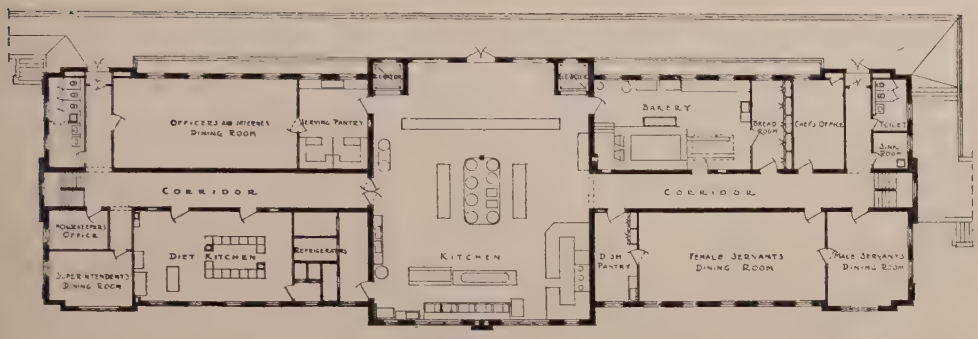



FIG. 540

hospital is in the center, whence the food is sent overground in heated cars, to the wards.

The service building of the Ottawa Civic Hospital, Ottawa, Canada (Figs. 550-550B), contains in its first floor: kitchen, receiving room, refrigerators, the special diet kitchen, and the servants' dining-rooms. On the second floor (mezzanine) there are extensive storerooms, including linen storage, and sewing-room. On the third floor are the dining-rooms for two hundred nurses and the staff, and shut off from the rest of the floor a suite of six bedrooms and a sitting-room for the housekeeper's staff. The fourth floor is occupied by the internes. The delivery of food is in the center front, whence the food

FIG. 541. KITCHEN BUILDING, CINCINNATI GENERAL HOSPITAL, CINCINNATI, OHIO.

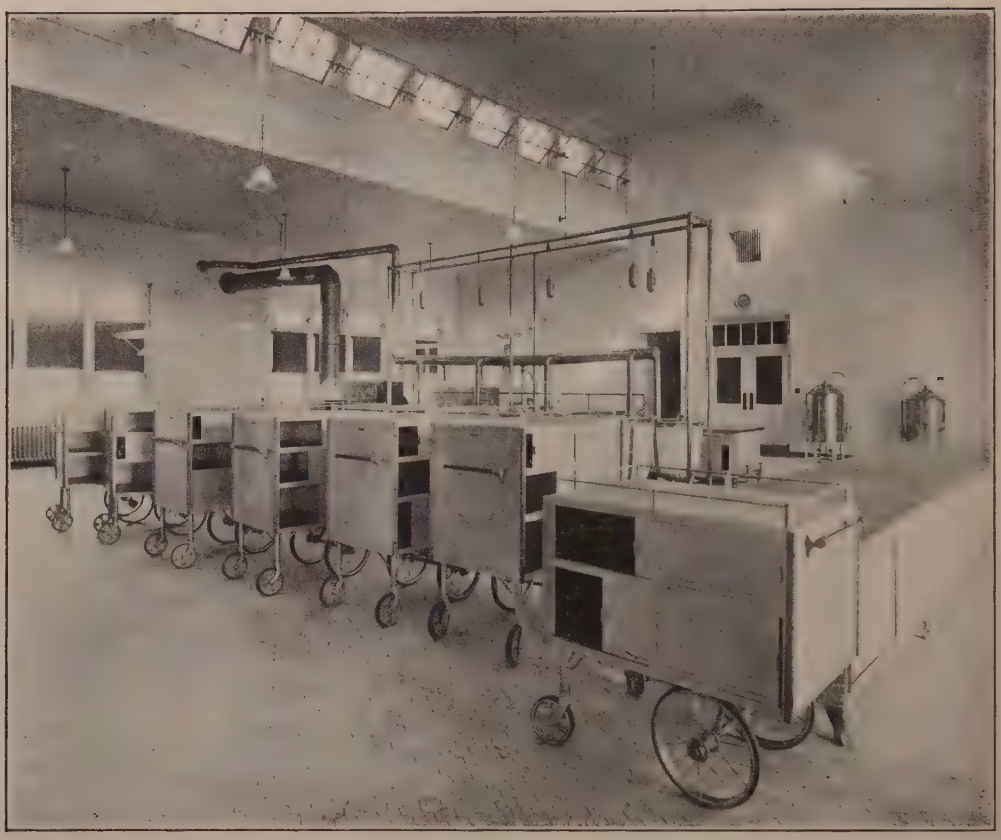


FIG. 542. FOOD CARS IN KITCHEN, CINCINNATI GENERAL HOSPITAL, CINCINNATI, OHIO.
Samuel Hannaford & Sons, Architects.

cars are sent through the tunnel to lifts at the right and left sides of the building. The housekeeper's office is at the right; also the servants' dining rooms, which have cafeteria service.

At the QUINCY CITY HOSPITAL, Quincy, Massachusetts (Figs. 532 and 533), the service building houses the power plant, kitchen and laundry. There is a refrigerating plant for ice-making and refrigeration. The stores entrance is under the supervision of the storekeeper, and is directly connected with the storeroom, laundry, linen-room and refrigerators. The service lift carries ice and kitchen supplies.

The laundry is near the linen storage room. The kitchen connects directly with the diet kitchen and the serving rooms for staff, nurses' and servants' dining-rooms.

Arrangements are made so that the garbage may either be incin-

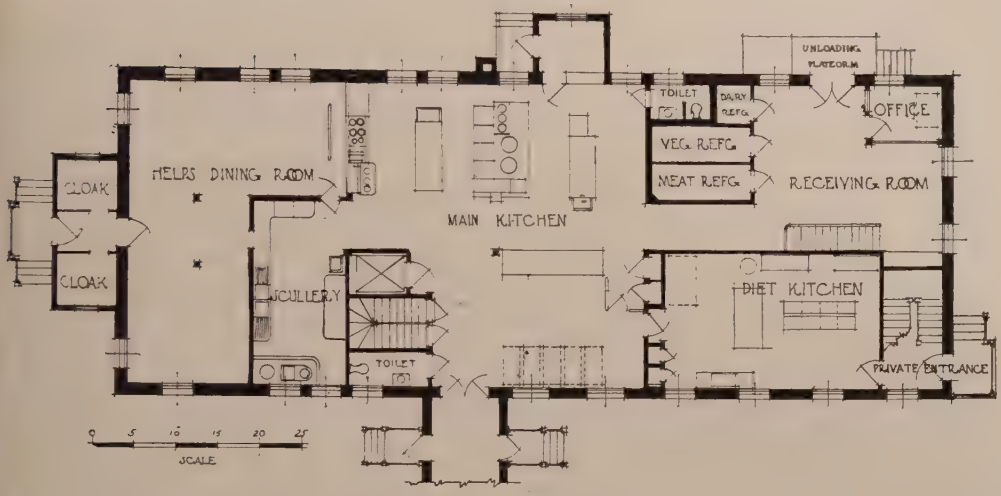



FIG. 543. FIRST FLOOR, SERVICE BUILDING, VICTORIA GENERAL HOSPITAL, HALIFAX, NOVA SCOTIA.
Stevens & Lee, Architects.

erated or put into a cooled compartment opening directly to the outside.

In the Victoria General Hospital, Halifax, Nova Scotia, service building (Figs. 543, 544), food supplies are received at the right, the range, cookers and service to the wards and dining-rooms are in the center, and the diet kitchen is at the right, near the supplies. There is a cafeteria service for the servants on this floor. The dining-rooms for superintendent, staff and nurses are on the second floor, with a central servery.

In the Ohio Valley General Hospital, Wheeling, West Virginia, the main kitchen (Fig. 108) is lighted from above and at the sides. It is ventilated through a large duct extending to the top of

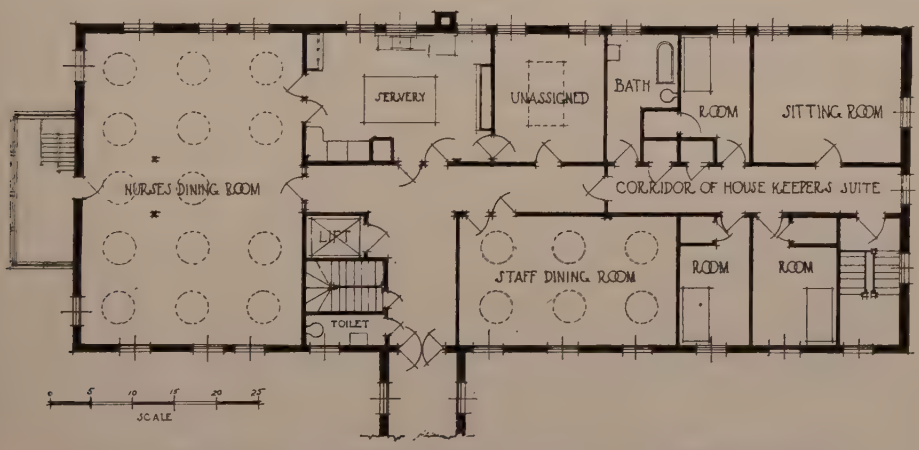



FIG. 544. SECOND FLOOR, SERVICE BUILDING, VICTORIA GENERAL HOSPITAL, HALIFAX, NOVA SCOTIA.
Stevens & Lee, Architects.

FIG. 545. MAIN KITCHEN, OHIO VALLEY GENERAL HOSPITAL, WHEELING, W. VA.

FIG. 546. KITCHEN, ROSS PAVILION, ROYAL VICTORIA HOSPITAL, MONTREAL, CANADA.

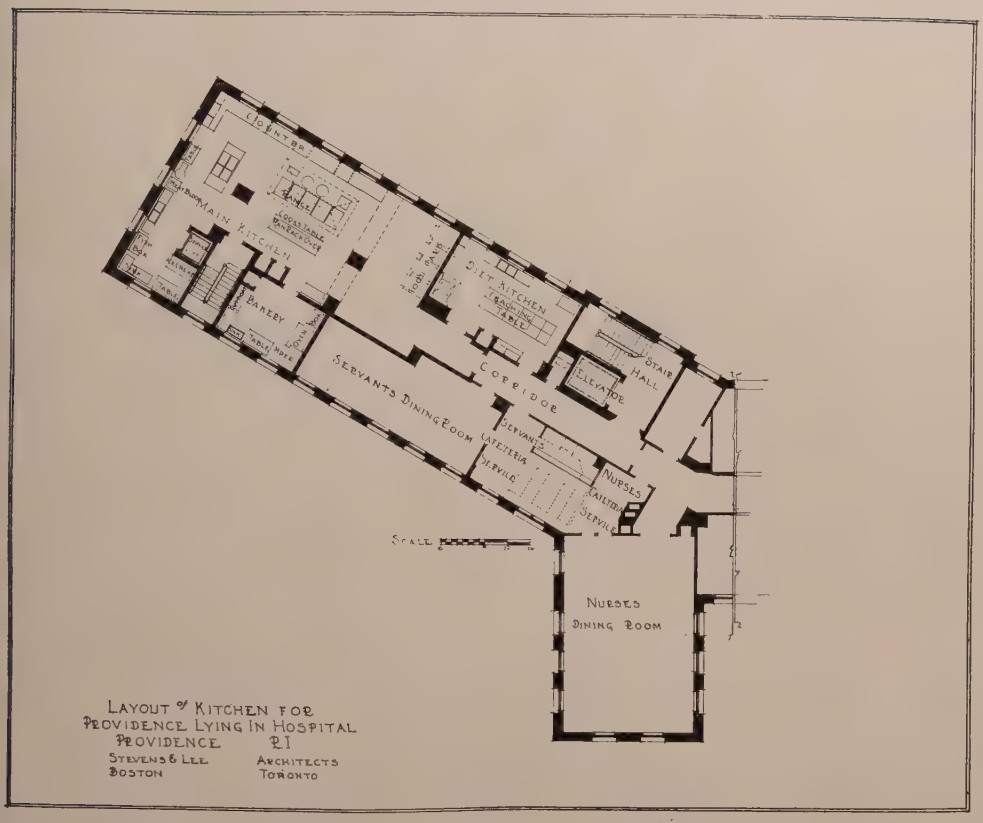



FIG. 547. KITCHEN PROVIDENCE LYING-IN HOSPITAL, PROVIDENCE, R. I.

the tower of the hospital building, so as to eliminate all kitchen odors from the hospital. The stores and refrigerators are at the right (other storerooms are on the floor below), the scullery and vegetable preparation at the rear of the kitchen itself, the cooking being done in the center. The service of food to hospital food cars and to the dining-rooms is in the space at the left of the plan. The dining-rooms are grouped around the serving end of the kitchen. The nurses' and servants' service is cafeteria. There is a restaurant for the friends of patients.

The kitchen portion of the PROVIDENCE LYING-IN HOSPITAL, Providence, Rhode Island (Fig. 547), is in a wing of the main building, on the first floor; the kitchen itself is at the end of the wing, with light and air on three sides. Supplies enter from the service court at the rear, the main storage rooms being in the basement. The serving space is in the center, the special diet kitchen next it, not far from the refrigerators, all designed for the quick loading of food

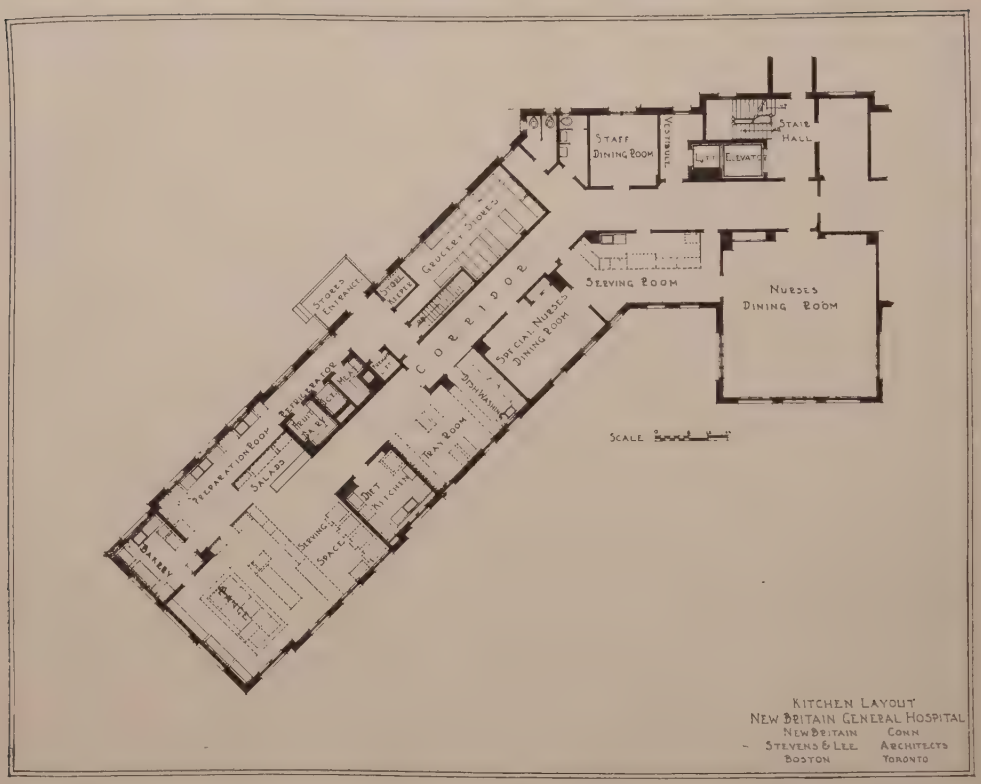



FIG. 548. KITCHEN NEW BRITAIN GENERAL HOSPITAL, NEW BRITAIN, CONN.

carts. The various dining-rooms are grouped together, with serving rooms for each, and arranged so that cafeteria service is possible if desired.

In the NEW BRITAIN GENERAL HOSPITAL, New Britain, Connecticut, the kitchen occupies the end of a wing (Fig. 548). The main storerooms are on the floor below, but there are storerooms and refrigerators conveniently placed. A bakery is provided and the diet kitchen is near at hand, with a tray room and dish-washing room next. The special service lift to each floor is next the main elevator. The dining-rooms are grouped so that one serving room is sufficient. The department is shut off from the rest of the hospital.

A central kitchen for a small hospital, planned by a dietitian (Fig. 549), illustrates the same principles of planning.

Attention is called to the kitchens of the NEW ROCHELLE HOSPITAL, New Rochelle, New York (Fig. 534), the GOOD SAMARITAN HOSPITAL, Sandusky, Ohio (Fig. 425), the LAWRENCE MEMORIAL HOSPITAL, Medford, Massachusetts (Fig. 138), the MARY LANE

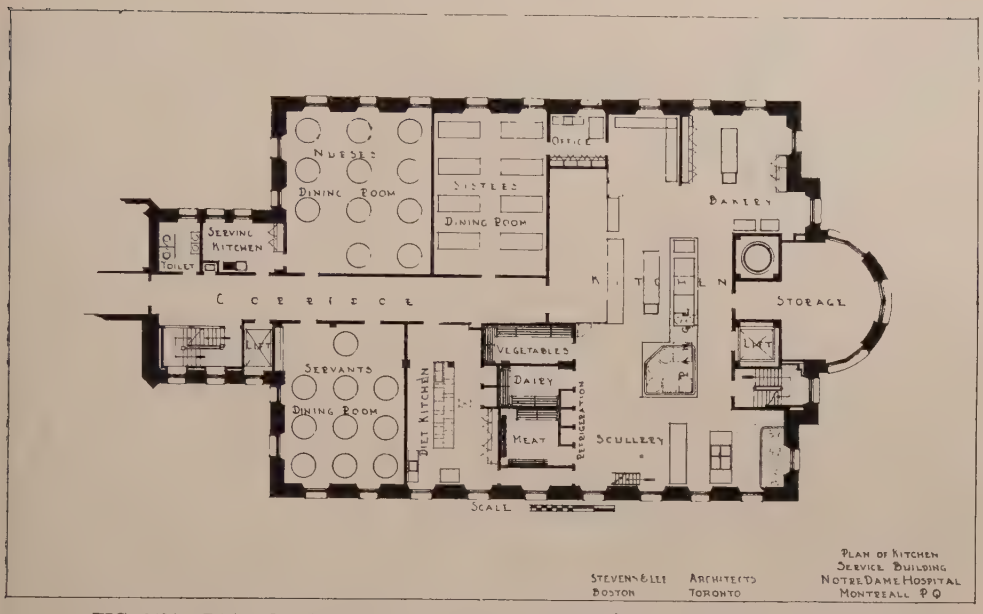
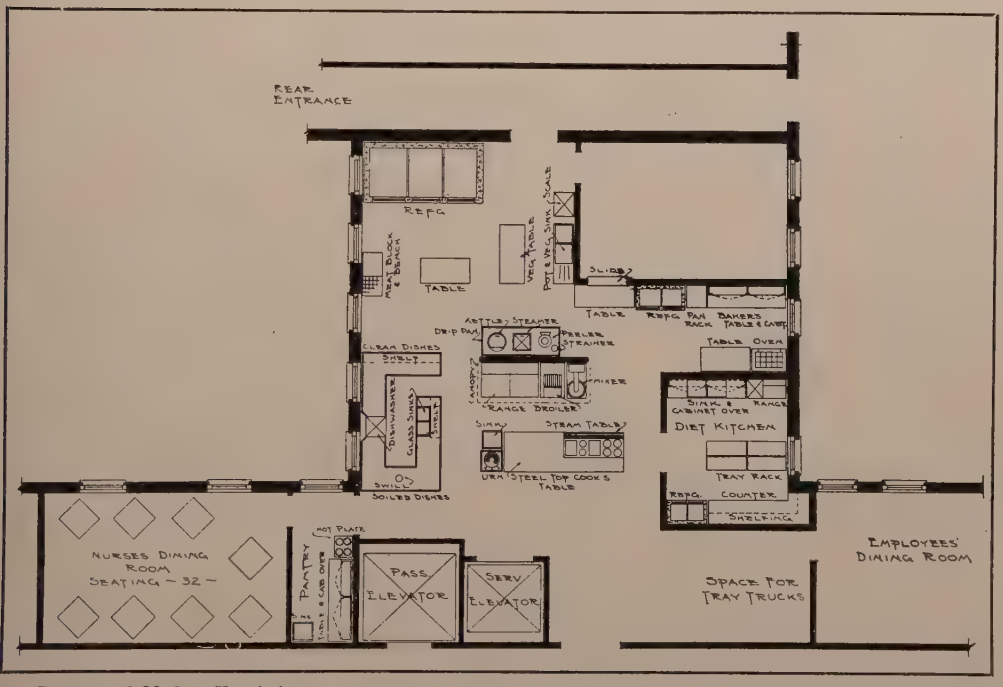



FIG. 548A. PLAN OF KITCHEN NOTRE DAME HOSPITAL, MONTREAL, CANADA




Courtesy of *Modern Hospital*

FIG. 549. KITCHEN PLANNED BY DIETITIAN

FIG. 550. KITCHEN, OTTAWA CIVIC HOSPITAL, OTTAWA, ONT.

Hospital, Ware, Massachusetts (Fig. 437), the Soldiers' and Sailors' Memorial Hospital, Penn Yan, New York (Fig. 429), and the Presque Isle General Hospital, Presque Isle, Maine (Fig. 440). These are small units, but the principles of planning are the same, that supplies shall enter at one side, be prepared there, cooked in the center, and served from the other side.

*Diet Kitchens.* Every hospital of considerable size should have a room for the preparation of special diets. This room should be near but not a part of the kitchen. It must also be near the food lifts and the route of service. It often has been customary to use the diet kitchen for a teaching kitchen for the nurses in training; and where this is the case, cabinets, fitted for individual service, are sometimes provided.

Dietitians are now using more apparatus in these kitchens, and electric outlets should be provided for the necessary motors.

In children's or infants' hospitals or units, where there are many milk formulae to be made up, a special room in this department, with sterilizers, is usually required.

Attention is called to the diet kitchens of the Cincinnati General Hospital (Fig. 540), the Ottawa Civic Hospital (Fig. 84), the Victoria General Hospital, Halifax (Fig. 543), the Ohio

FIG. 550A. EXTERIOR, SERVICE BUILDING, OTTAWA CIVIC HOSPITAL, OTTAWA, CANADA
Stevens & Lee, Architects

Valley General Hospital, Wheeling, West Virginia (Fig. 108), the New Rochelle Hospital (Fig. 534), the Providence Lying-in Hospital (Fig. 216), the New Britain General Hospital (Fig. 147), the Brandon General Hospital (Fig. 129), and the Everett General Hospital (Fig. 134).

*Serving Kitchens.* The ward serving kitchen has a place among the important rooms of a hospital, for in this room the trays for the food are prepared, and from it the food is distributed. If the serving kitchen is conveniently arranged, the food is more likely to be brought to the patient in the best condition. And what a difference even the looks of a tray makes to a delicate patient!

How often one hears it said about a hospital, "The operating room technique is perfect; the nursing is all that can be desired; but the food —and the service!" Good food, properly served, goes a long way toward offsetting deficiencies in other departments.

The serving kitchen should be of sufficient size to do the work properly. In one of the earlier hospitals designed by the writer, the planning of which was directed largely by the building committee, the desire on their part to make every inch available for patients

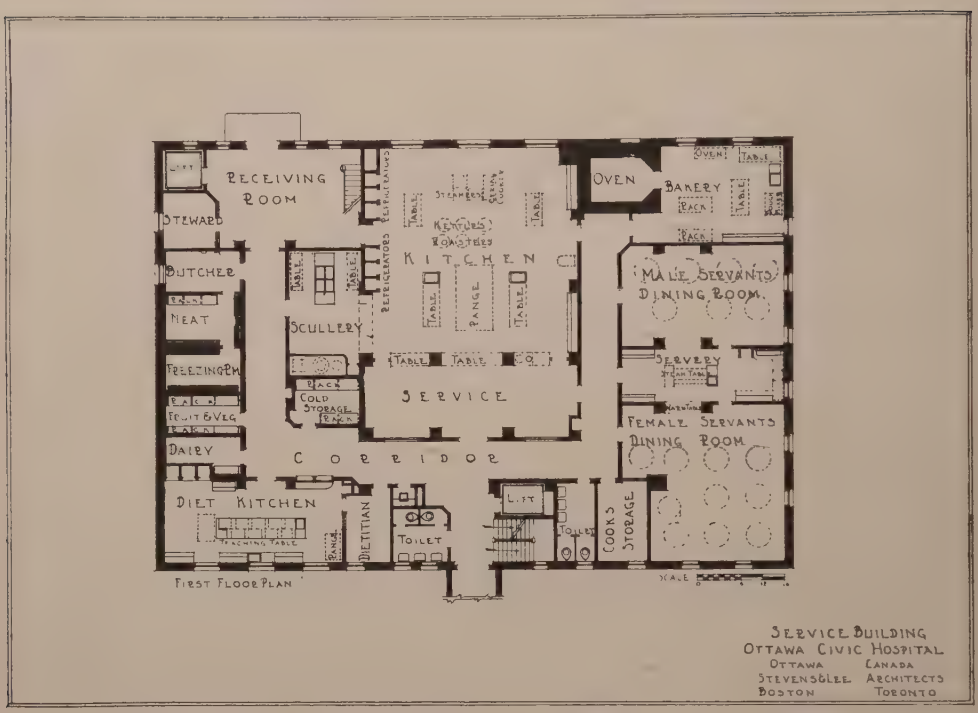



FIG. 550B. PLAN OF KITCHEN OTTAWA CIVIC HOSPITAL, OTTAWA, CANADA

made it necessary for the serving kitchen to be so reduced in size that it has always been a great drawback to the best serving of meals. A little more space devoted to this room would have added greatly to the comfort of both nurse and patient.

What are the essentials and what are the luxuries of a serving kitchen? The essentials are:

*1st, Proper Location.* Remember that a ward serving kitchen is a very busy place three times a day. Many utensils must be handled, washed and put away; food trucks are going and coming; so that this room should be located remotely or in such a way that the sound from the room is cut off from the patients. This may be accomplished by having the serving kitchen entered from a side corridor, as in the Melrose Hospital (Fig. 415); or through a vestibule, as at the Royal Victoria (Fig. 124); or by having it entirely apart, as at the Bridgeport Hospital (Fig. 192).

In the Ottawa Civic Hospital (Fig. 84) and the New Britain General Hospital (Fig. 147) the food lift is placed back to back with the passenger elevator; if one is out of commission for any reason, the other may take its place.

*2nd, Room Enough to Lay Trays.* There should be room enough,

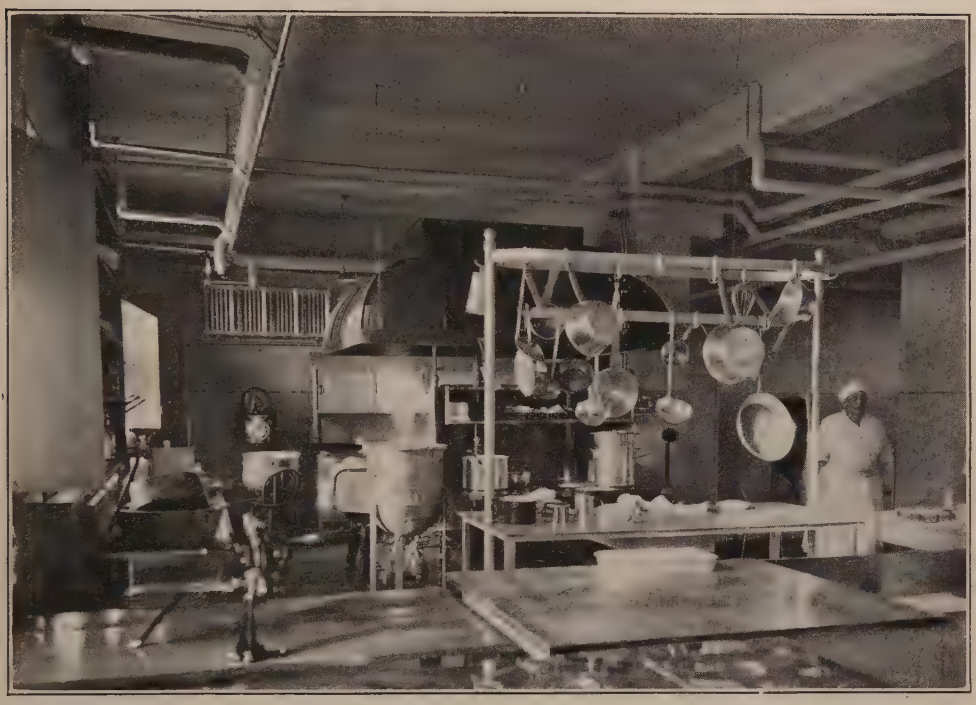


FIG. 551. KITCHEN, EVERETT GENERAL HOSPITAL, EVERETT, WASHINGTON

FIG. 552. DIET KITCHEN, BRIDGEPORT HOSPITAL, BRIDGEPORT, CONN.

FIG. 553. SERVING KITCHEN, ROSS PAVILION, ROYAL VICTORIA HOSPITAL, MONTREAL, CANADA

and the room should be so planned that no one will be crowded while preparing the meals. If the building is a multi-story building special food lifts, large enough to carry a food car, should be provided, and space enough to bring the car into the room to discharge it.

In moving the food from the kitchen it should be handled as little as possible. To that end, the food truck loaded in the kitchen should not be disturbed until it reaches the serving kitchen. This food truck can be taken on the serving elevator; or, better still, special food elevators may be provided, working automatically from the sending point on the kitchen level. These food trucks can be kept warm by electricity, hot water, or hot soapstone. The one shown in the illustration (Fig. 559) is heated by soapstone.

*3rd, Keeping Food Warm or Cold.* The steam-table is almost indispensable for keeping food hot, and should be provided with a gas plate and warming closet.

Tray racks of sufficient capacity for holding all trays should be provided. These racks should be mounted on ball-bearing casters, so that if required the trays can be brought *en masse* to the ward

door. The use of the portable hot table is growing in popularity (Fig. 560). For some classes of patients this makes the most satisfactory method of serving.

Refrigerators should be built or selected with care and, with due regard for hygiene, should be either porcelain or tile lined, and should have properly trapped drains. If there is a refrigerating plant, by all means extend the pipes to these small serving-kitchen refrigerators.

The self-contained, electrically operated refrigerators are still in the experimental stage.

*4th, Utensils and Their Cleaning.* Among the luxuries of the serving kitchen might be counted special egg boilers, coffee percolators, individual services for private patients, special china and glass, hot plates and more attractive trays and linen.

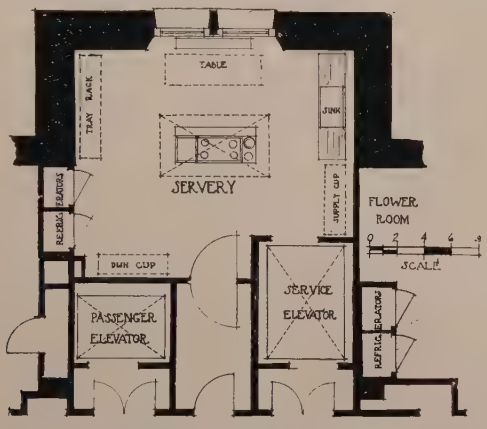



FIG. 554. SERVING KITCHEN, ROSS PAVILION, ROYAL VICTORIA HOSPITAL, MONTREAL, CANADA
Stevens & Lee, Architects

Where the dishes from patients with infectious diseases are cared for, the dish sterilizer is absolutely essential.

The location and size of the sink is important. There should be an ample drainboard and the sink set high. The tendency of the plumber is to place the sink at his standard height, making everyone who uses it stoop, while placing it a few inches higher would save many a backache. The material for the sink is largely a matter of fancy. Iron, porcelain and soapstone are used.

A suitable receptacle should be provided for the dishes and utensils after they are cleaned. The cabinet should be hygienic in its construction, easily cleaned, with slanting top so that the dust may be seen and removed. It should contain drawers and cupboards enough to

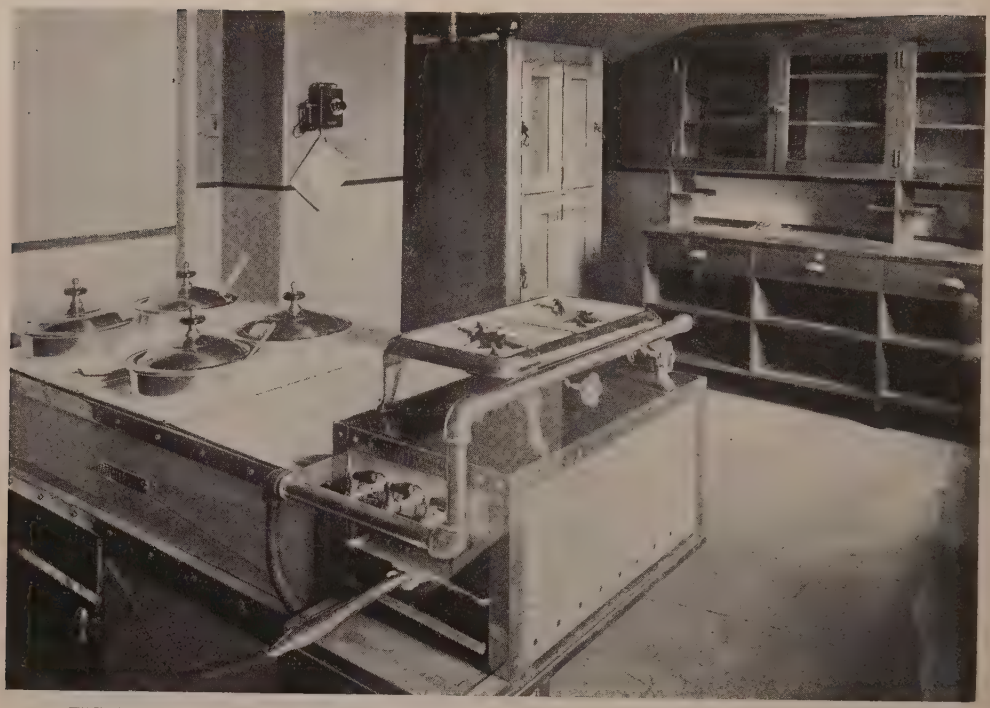


FIG. 555. SERVING KITCHEN, OHIO VALLEY GENERAL HOSPITAL, WHEELING, W. VA.

FIG. 556. SERVING KITCHEN, ST. LUKE'S HOSPITAL, NEW BEDFORD, MASS

store the cutlery and silver needed in the section served by ward kitchen.

*In General.* The room should be tiled to a height of four feet. If the expense of this is prohibitive, place tiling at least back of all plumbing fixtures.

The floors should be of a non-porous substance, like magnesite, terrazzo, or tile; if of tile, a gray or buff is much easier to care for than white.

The plan of the serving kitchen of the Ross Pavilion of the Royal Victoria Hospital, Montreal (Fig. 554), illustrates the principles laid down above.

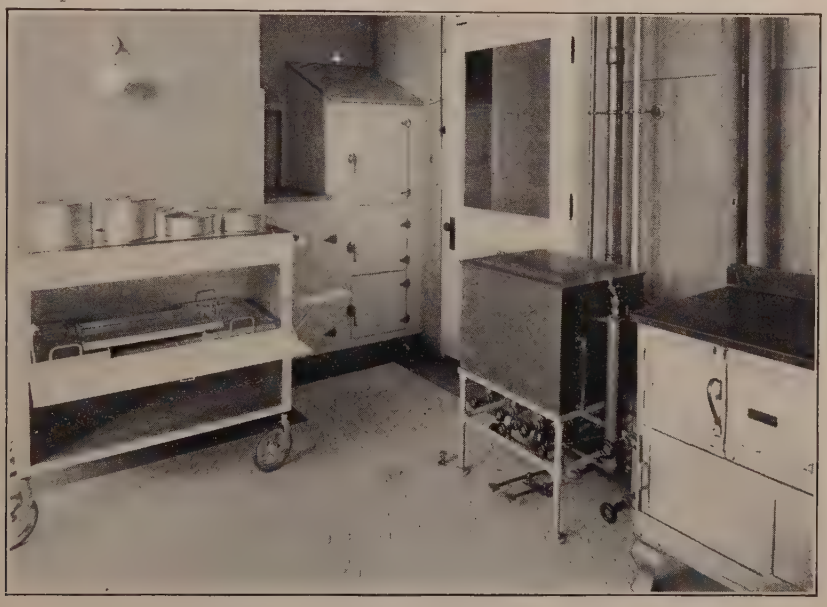


FIG. 557. SERVING KITCHEN, SHOWING FOOD TRUCK, CINCINNATI GENERAL HOSPITAL, CINCINNATI, OHIO

*Dining Rooms.* The dining-room for nurses (if in the same building with the kitchen) should be in a well-lighted portion of the building, and some attention should be paid to the decoration and artificial illumination. A serving room, equipped with steam table and coffee urns, should be placed between kitchen and dining-room if possible.

It has been found in many institutions that a dining-room or restaurant for friends of the patients is not only a source of satisfaction to the friends but also a profit to the hospital.

The feeding of nurses has been accomplished in an economical way in many institutions by establishing a self-serve system, where each person selects what suits her best, takes it to the table and eats.

This removes dissatisfaction on the part of the nurses, facilitates the service, and reduces the number of waiters.

Cafeteria service is now quite common for nurses and for servants' dining-rooms.

More attention is paid to the design and finish of the kitchens in many of the larger European hospitals than in this country (Figs. 535, 536, 538, 539).

### THE LAUNDRY

Like the kitchen, the laundry and disinfecting plant should have an accessible location to which the soiled linen and articles for dis-

FIG. 558. AUTOMATIC LIFTS FOR FOOD CARS

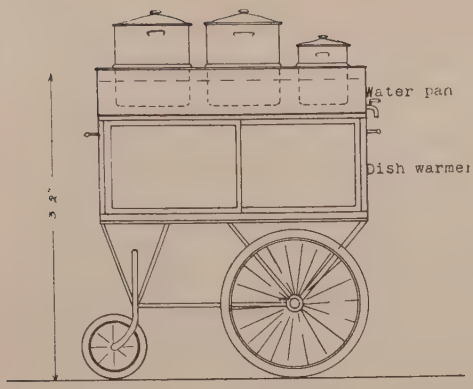
FIG. 559. HEATED FOOD TRUCK
Heat is applied by inserting hot soapstones in pockets at the sides

infecting can be easily brought and from which the fresh linen can be removed. The size and character of the building are, of course, governed by the requirements and size of the institution.

In a hospital on a restricted site, the laundry, if well ventilated, may be placed within the hospital building, but where space permits, it is eminently desirable to have it in a separate building, since the necessary noise and vibration of the machinery are sure to annoy the patients. Where there is a service building, both kitchen and laundry may properly be located in it. There must be light and air, and any

FIG. 599A. FOOD TRUCK. CLOSED

FIG. 559B. FOOD TRUCK, OPEN

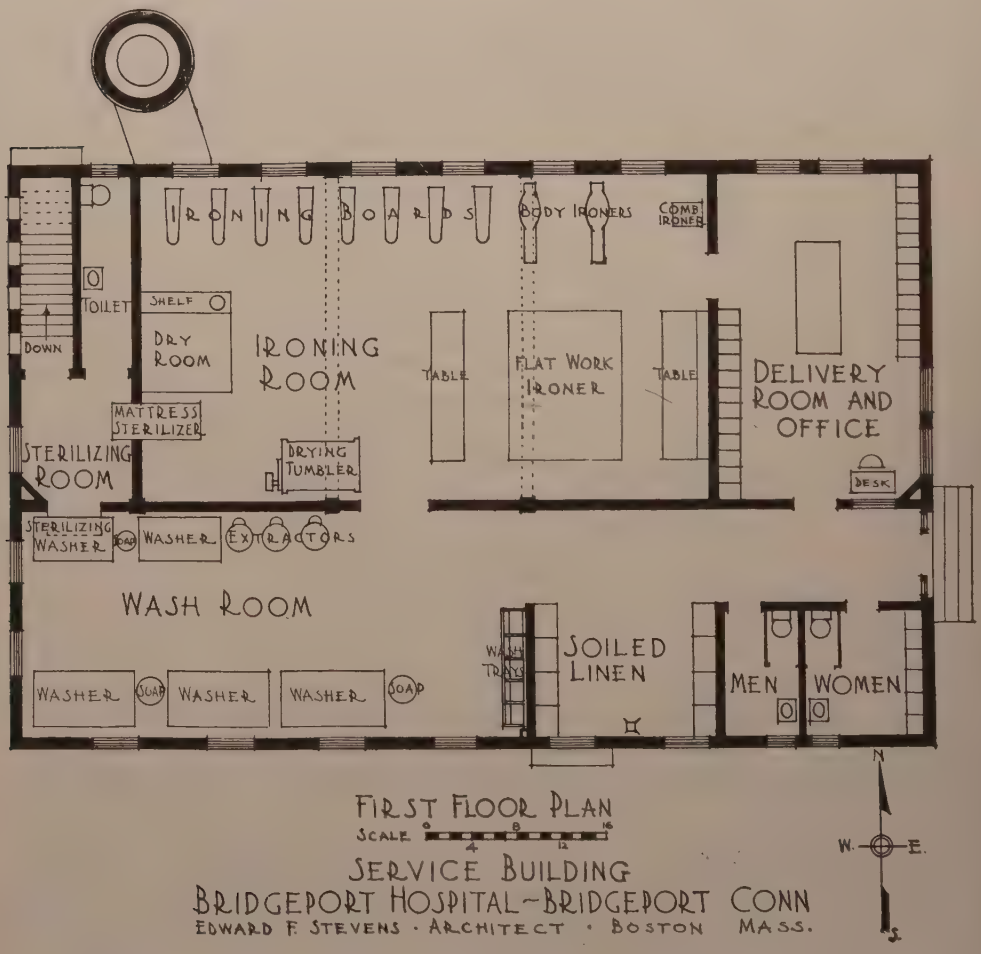



FOOD CAR.

Plan.

For serving patients direct from car.

FIG. 560. PORTABLE STEAM TABLE




FIRST FLOOR PLAN

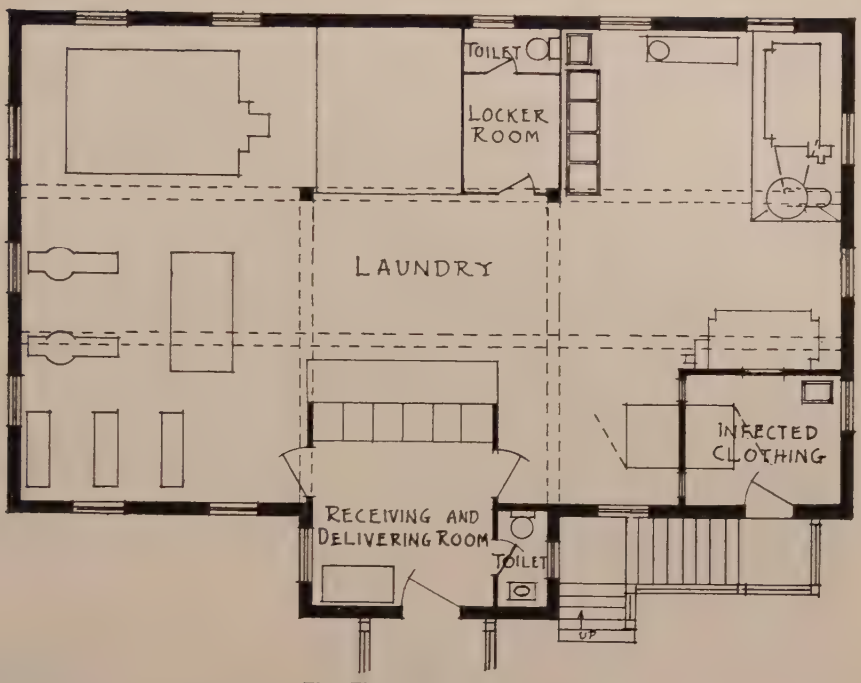
SCALE 0 4 8 12 16

SERVICE BUILDING

BRIDGEPORT HOSPITAL—BRIDGEPORT CONN

EDWARD F. STEVENS · ARCHITECT · BOSTON MASS.

FIG. 561




First Floor Plan

FIG. 562. LAUNDRY, St. LUKE'S HOSPITAL, JACKSONVILLE, FLA.
Edward F. Stevens, Architect

FIG. 563. LAUNDRY, HOSPITAL FOR SICK CHILDREN, TORONTO, CANADA

FIG. 564. LAUNDRY, OTTAWA CIVIC HOSPITAL, OTTAWA, CANADA

necessary exhaust fans. Easy transportation for soiled linen from ward and other buildings should be provided—a covered corridor above or below ground being desirable.

Every hospital should have its own laundry, or space allotted for it; since even if laundry is being sent out, circumstances or policies may change at any time.

The chief problem in a hospital laundry is quantity production, while less regard is paid to finish. In planning, both present and possible number of pieces per week should be ascertained, as a basis for the required size and number of machines to be provided.

In planning the hospital laundry, the same care and thought should be used as in planning a factory; that is, to secure the greatest efficiency in the work, from the bringing in of the soiled linen to the delivery of the clean. From the sorting room to the linen room, an effort should be made to avoid lines of crossing and re-crossing; one process should follow the other until the work is completed.

The "wet work" of washing, starching, extracting, etc., should be kept by itself and so arranged that the clothes will pass readily from one machine to the next—from the washer, extractor, flatwork ironer, drying tumbler, steam press and ironing boards, on to the clean linen room. In the wet portion, the floors must be of some moisture-resisting material, with proper drains, but in the ironing section it is important that a resilient floor, wood or linoleum, be provided.

FIG. 564A. EXTERIOR LAUNDRY BUILDING, OTTAWA CIVIC HOSPITAL, OTTAWA, CANADA
Stevens & Lee, Architects

In regard to the equipment of the laundry, much may be said, but whatever apparatus is used, the principle which has been set forth for the conservation of human energy should be brought into play in this department. For a single example take the sorting bins; if these be placed high enough so that it is not necessary to stoop every time a single article is handled and if these sorting bins are made with easy-rolling wheels, the transmission of the soiled linen will be secured with the least amount of fatigue on the part of the operators.

The various items of machinery should be selected for the efficiency they will show. A washing machine capable of doing the work of three ordinary machines and costing the price of two is an economy.

The same is true with reference to the extractor, the mangle, the drying tumbler, etc.

Electricity is rapidly taking the place of gas and steam in many of the laundry operations. The body ironer has been superseded by the steam press.

Drying tumblers have largely taken the place of dry rooms.

In a large hospital it is considered desirable to have the staff linen laundered in an entirely different department from the hospital linen.

An adequate number of sorting boxes should be provided.

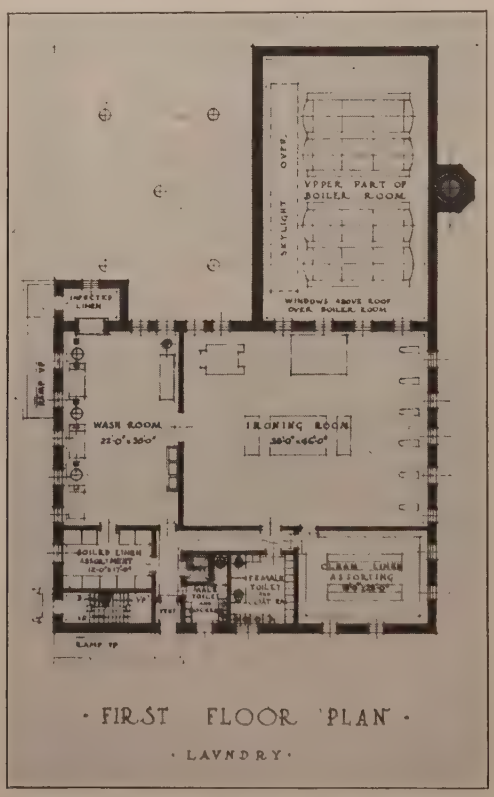



FIG. 564B. LAUNDRY, OTTAWA CIVIC HOSPITAL, OTTAWA, ONTARIO

Stevens & Lee, Architects

It is undoubtedly an economy to have the main linen room of the institution connected directly with the laundry, from which the freshly laundered articles as well as the new supplies can be given out. In this way, the linen, whether new or old, is under one supervision.

A few illustrations will serve to show some of the points mentioned.

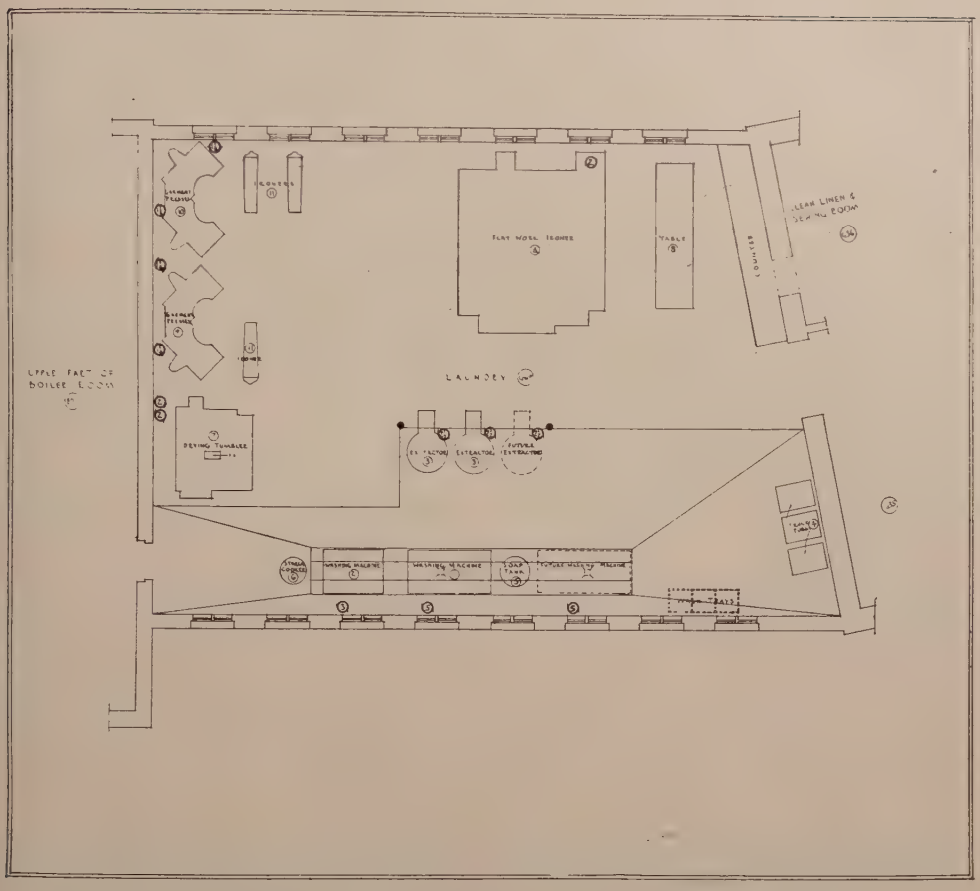



FIG. 565. PLAN OF LAUNDRY, PROVIDENCE LYING-IN HOSPITAL, PROVIDENCE, R. I.

In the laundry of the Bridgeport Hospital (Fig. 561), the writer has attempted to work out the principles mentioned; that is, the soiled linen is first taken care of in the soiled linen sorting room; then carried to the wash room where the wet washing work is done; thence through the drying room, mangle and linen room, into the main linen supply room. Provision for infected clothing, which is brought in through a separate entrance and introduced into the washing department of the laundry through a sterilizer or sterilizer washer, is here provided.

In the small laundry of the St. Luke's Hospital at Jacksonville (Fig. 562), where care of both general patients and contagious cases is provided, the same provision is made for the infected linen—passing through a disinfector before reaching the laundry proper.

In the laundry of the Ottawa Civic Hospital (Fig. 564B), the

soiled linen is brought from the hospital by car or truck to the entrance at the left of the building; the trucks come up a ramp directly to the sorting room, so that there is no lifting. The sorting room is directly off the wash room. Infected linen goes to a special entrance at the rear, is put into the disinfector there, and taken out from the laundry side. To the right of the wash room is the ironing room, with a drying tumbler for blankets, pillows, etc., and a dry room at the rear. The flat-work ironer is in the center. The hand ironing boards and special ironers are near the windows. There is plenty of table space. The clean linen sorting room, with tables, shelves and boxes, is at the front, near the entrance.

The laundry of the QUINCY HOSPITAL, Quincy, Massachusetts (Fig. 532), is entirely in one room, the sorting being at the right hand side, the washing on the outer wall, and the drying and ironing in the center and the other side. The sewing and linen room adjoins. There is light and air from three sides.

In the laundry of the PROVIDENCE LYING-IN HOSPITAL, Providence, Rhode Island (Fig. 565), the service for both soiled and clean linen is taken care of in a routine way, and the clean linen room adjoining the laundry is provided with facilities for all the clean linen of the hospital. The service building of the NEW ROCHELLE HOSPITAL, New Rochelle, N. Y. (Fig. 534), takes care of a hospital of 75 to 100 beds. There is a fair sized kitchen, and three dining rooms which are served directly from the kitchen. In the laundry there are sorting bins for soiled linen, near the washer, tubs for hand work, soap and starch kettles, a drying room, and space for hand and machine ironing. There is a good sorting room for clean linen.

# CHAPTER XVIII

## HEATING, VENTILATING AND PLUMBING

THE power plant, the center of the mechanical end of the hospital, in many respects is not unlike the power plant for any institution or manufactory. A hospital plant, however, is unique in its demand for the production of steam in an economical way, the transmission of the steam into horsepower energy, either for generating electricity, furnishing high pressure steam for laundry, kitchen, or sterilizing room, inasmuch as steam—i. e. high pressure steam or its equivalent—is needed twenty-four hours a day and three hundred and sixty-five days in the year for sterilizing. Therefore there is little saving made, even in a small plant, by using low pressure heating and using gas or electricity for sterilizing.

Using steam for sterilizing, cooking, and laundry, it can be readily seen that the generating of electricity would show a marked economy, even in the small institution, for in the heating months the exhaust steam from the engines would serve for heating the buildings, reducing the cost of current and heating to a minimum. It is not intended, however, in this book to discuss the power plant methods, but merely the portions of the plant affecting the health and comfort of the patient.

The much discussed problem of how properly to HEAT AND VENTILATE a hospital building has still many unsettled points, almost as many as the floor problem. It is still undecided whether it is best to conduct the air to the ground floor or basement, heat it there, send it through the building warmed, washed and humidified, and force it into the closed room under thermostatic control at a given temperature night and day, a system which necessitates for its perfect working the closing of all doors and windows; or whether to heat the air by means of indirect radiators in the basement or pipe space and conduct it by its own ascentive force to the rooms or wards; or whether to use the simple system of putting the heating units in the room and introducing outside air directly below or above the radiators; or whether by direct hot water, direct steam, or a combination of various systems.

One of the simplest methods and one adopted by the writer for securing fresh warmed air is a modification of the commercial direct-indirect radiator (Fig. 566). A radiator (hospital type preferred) is set on brackets four inches above the floor; air is introduced

through the outside wall directly in line with the bottom of the radiator. A shield, hinged at the bottom to allow for cleaning and extending under the radiator joining the intake pipe, prevents direct cold air from entering the room; and a damper in the direct flue governs the amount of air. At the GENERAL HOSPITAL at Vienna, outdoor air is introduced directly above the radiator, as shown in Fig. 567.

Another simple device for introducing fresh air directly over the center of the radiator is shown in Fig. 571A.

Many medical men and hospital experts agree that the patient in bed, except in special cases, should not have a high temperature in his room. They agree that Nature calls for changes in temperature

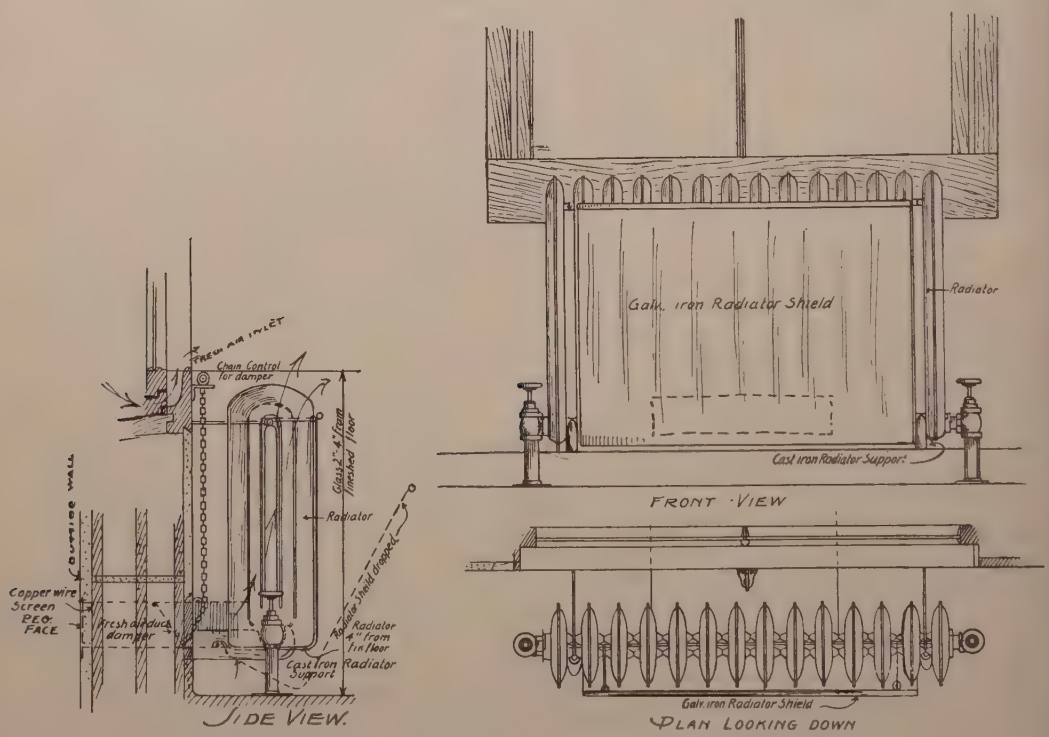



FIG. 566. DIRECT-INDIRECT RADIATOR, SHOWING REMOVABLE SHIELD

—that the man in robust health demands them; that the patient who is building up his strength should not be denied them. A certain professor in a technical school used to say to his class that the ideal temperature is that of a sunny June day in a New England pine forest. Such an idea does not involve an even temperature of sixty-eight degrees for the entire day.

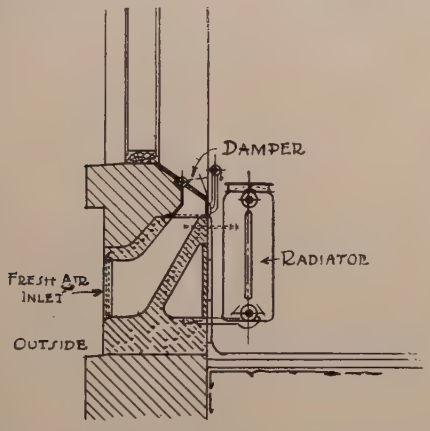
Manufacturers of various apparatuses pride themselves on con-

trolling the temperature of a room to a fraction of a degree, as shown by chart record (Fig. 568). This would not seem to be conducive to the best results, except under certain conditions.

The breathed air in a ward or room should be in some way removed, and the means for ventilating so located as to insure a complete circulation of air. If the room is large, there should be vents at top and bottom, with dampers, so that the air can be drawn from either one or the other, by properly adjusting the damper.

The vent ducts should start at the floor, and the floor material extended to the back of the flue (Fig. 569), or the bottom of the flue curved so that no dust shall remain in it. In no case should a register face be used to close the opening at the floor.

However the air is introduced, the exhaust should be placed so as to vent all parts of the room. If the air is introduced at or near




METHOD OF HEATING GENERAL HOSPITAL AT VIENNA

FIG. 567

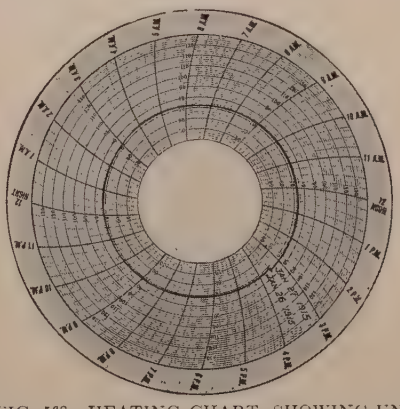


FIG. 568. HEATING CHART, SHOWING UNDESIRABLE CONDITION FOR SICK ROOM

the window, the exhaust should be near the door. The desirability of ventilating the clothes cupboards as well as the room led the writer to adopt the method of placing the room vent in the ceiling of the cupboard, cutting the door thereto so as to leave an open space below, setting the cupboard shelf away from the wall, and in this way allowing a free circulation of air, ventilating the room and cupboard (Fig. 571).

The natural "tepee" form of ventilation is used in a number of Massachusetts institutions—that is, providing for heat units on the outer walls, either radiators or coils; making the side walls low, about seven feet, and sloping the ceiling at least thirty degrees to a monitor

vent. The result is ideal heating and ventilation, but the difficulty of using this method in large units is the necessary waste space involved in the sloping ceiling and the monitor, although this has been carried out in the Children's Hospital in Boston, in the State Hospital School for Crippled Children at Canton, Massachusetts (Fig. 572), and in the children's ward of the Worcester City Hospital (Fig. 245).

The use of hot water for general heating and steam for special ventilating units gives satisfactory results. The hot water may be in coils of large pipes, easily cleaned, or radiators of hospital type

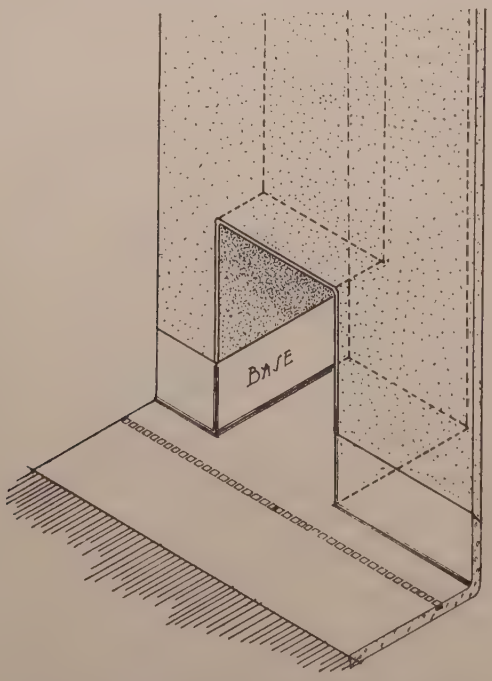



FIG. 569. DETAIL OF VENT FLUE AT FLOOR

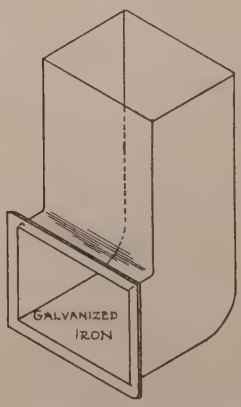



FIG. 570. DETAIL OF VENT FLUE ABOVE FLOOR

set away from the wall; but the common ornamental radiator, set close to the wall, should never be used in the sick room, since every surface should be available to the brush or vacuum cleaning pipe.

No institution is so economical to heat as is a hospital, because it can be done by utilizing exhaust steam from the engines which produce power for the electric light, laundry, and refrigeration. A very small part of the heat units is removed in passing through the engine. The method is therefore a decided economy in the production of power and in the heating of the building.

The heating of the operating room at St. Georg's in Hamburg

is one of the more elaborate systems. In the section shown (Fig. 158), it will be observed that the outer sash is double and the air conducted entirely around this hollow space, warming in winter and cooling in summer the floor, the walls, and the ceilings. In winter, additional heat is secured from direct radiators behind thin nickel plates shown in the walls, but allowing no air from this source to enter the room. The air for the operating rooms is brought first into a clean chamber where it is passed through ground coke, thence over heated coils in winter and over ice in summer, into the fan, where it is

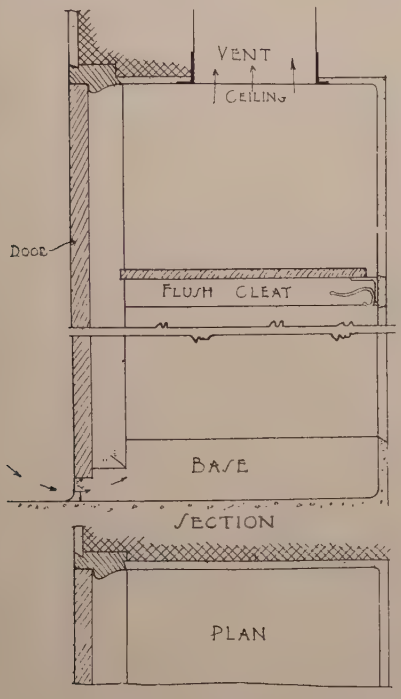



FIG. 571. DETAIL OF VENT TROUGH CLOSET

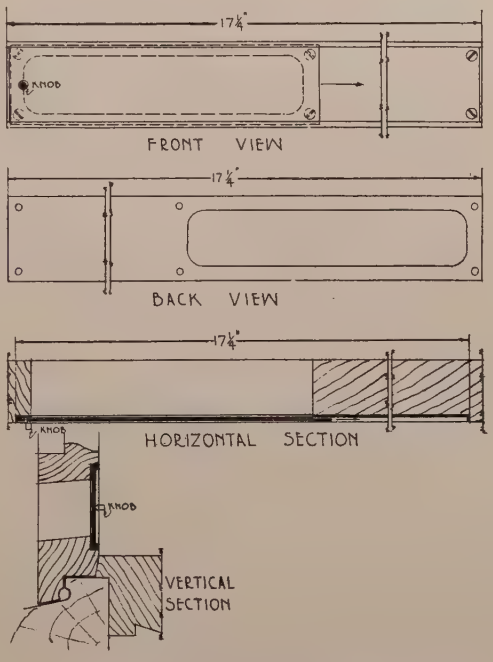



FIG. 571A. DETAIL OF WINDOW VENTILATOR

driven through a filter of fine sand and gravel, and taken thence to the operating rooms, practically free from all bacteria. The ceiling vents in the operating rooms are closed and there is sufficient pressure outward so that the opening of a door does not admit any foul air.

A simpler method for the heating and supplying of fresh air for the operating room is by the use of a screen or false wall inside the operating window. The heating unit is placed between the screen and the outer window, introducing outdoor air at the top (not the bottom) of the radiator. The air from the room drawn under the screen mingles with the outdoor air, is heated, and passes out over

FIG. 572. HOSPITAL SCHOOL AT CANTON, MASS., SHOWING ROOF VENTILATION

the top of the screen, warming the room by this inflow and by direct radiation from the glass screen. Additional radiating surface may be placed above the ceiling lights. To prevent the entrance of any dust from outside, gauze removable screens may be placed in the openings at the top of the screen. A section through the operating rooms of the Ross Pavilion of the Royal Victoria Hospital (Fig.

573) will serve to show this method, and a reference to the illustration of operating rooms at the BRIDGEPORT HOSPITAL (Fig. 172) will show the effect from the room.

Additional radiation may be secured by radiators entirely concealed in wall pockets whose openings are covered with metal plates or marble slabs. Fully fifty per cent. of the radiation is lost in this process, though the radiator is hidden effectually and hygienically.

It is desirable to use forced ventilation in the operating suite, if nowhere else. If the suite is small, the fan may be placed nearby and operated when the rooms are in use. Gravity ventilation, however, should be provided, with a bypass valve so connected with the switch and fan that when the fan is stopped the damper automatically opens

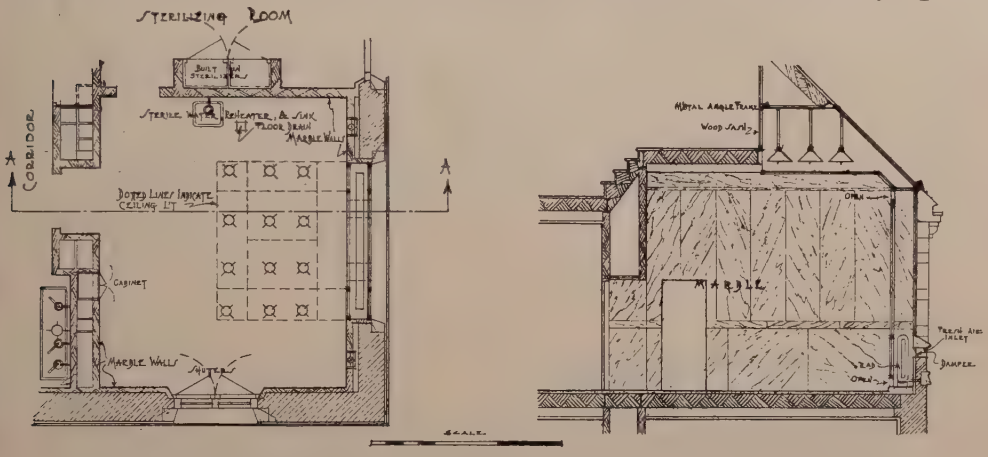



FIG. 573

to the gravity vent, which itself should be accelerated by a steam coil.

No attempt is made here to furnish data for the power plant or the heating and ventilation of the hospital, for these should be worked out with the heating specialist; but these few suggestions are offered as the results of the observation of the writer in his own practice.

## FIRE HAZARDS

The question of fire protection is one which should have very serious consideration.* One might broadly say that no medical

*During the years of 1919 and 1920 there were 870 fires in hospitals, asylums and sanatoria in the United States and in these fires many lives were lost, as well as tremendous loss of property.

FIG. 574. SURGEONS' SCRUB-UP IN OPERATING SECTION, QUINCY CITY HOSPITAL, QUINCY, MASS.

FIG. 576. BABY BATH

institution should be built of anything but non-combustible material, or what is known as fireproof construction, but even with

FIG. 575. BATH IN ADMITTING ROOM, ISOLATION BUILDING, ST. LUKE'S HOSPITAL, JACKSONVILLE, FLA.

the most carefully built structure of non-combustible material there is still a fire menace, for the furniture, the clothing, draperies, etc., are bound to be of material which will not resist fire and the smoke menace becomes almost as dangerous as the fire menace, and every hospital should be equipped not only with means of egress at various parts of the institution but with means of sub-dividing sections of the institution by fire walls and fire doors; for with a very sick patient it is much easier to move the patient in a horizontal direction beyond a fire wall than to attempt to get that same patient out of the build-

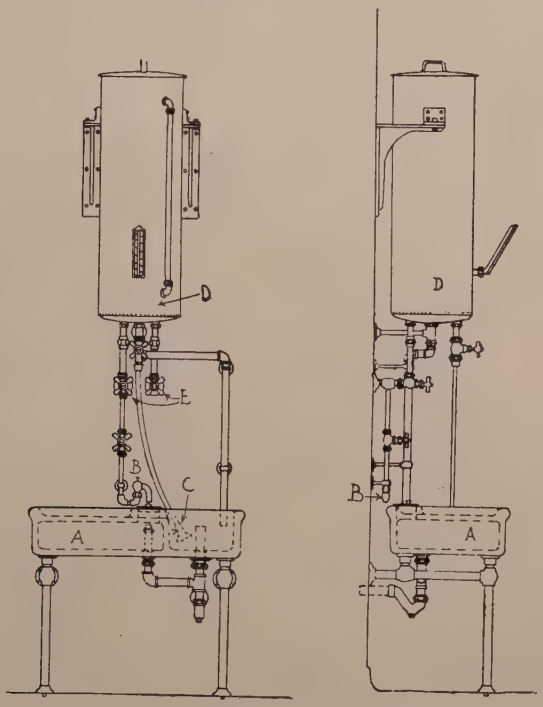



FIG. 577. DETAIL OF BABY BATH

A—Hot water compartment for heating slab.
B—Hot water swing joint to fill compartment A.
C—Flexible hose with self-closing spray.
D—40-gallon storage tank, with thermometer and gauge glass.

ing by means of staircase or fire-escape. The writer feels that the enclosed fire-escape or staircase is much more satisfactory than one on the exterior of the building, much more easily controlled and less unsightly.

Provision should be made for the extinguishing of fires either by hose line, fire extinguishers or, in certain locations of the hospital, sprinklers. The writer, however, is of the opinion that there should be no sprinklers in the portion of the hospital where patients are

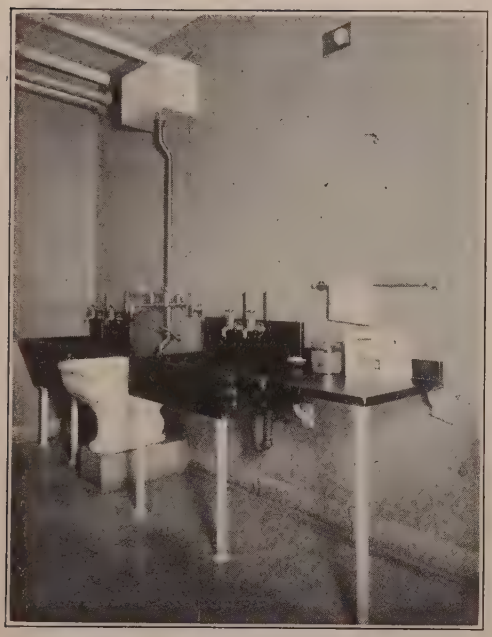


FIG. 578. SLOP SINK AND SINK

FIG. 579. "UTILITY" TOILET WITH BEDPAN WASHING DEVICE

FIG. 580. LAVATORY IN PRIVATE ROOM

FIG. 581. SURGEONS' SCRUB-UP SINKS

FIG. 582. PLUMBING IN NURSES' WORK ROOM OF OPERATING DEPARTMENT

located, but that basement, storerooms, laundries and kitchens may well be provided with a sprinkler system.

Hospital plumbing, so far as the pipes, drains and vents, and the so-called "roughing-in" are concerned, is no different from that for

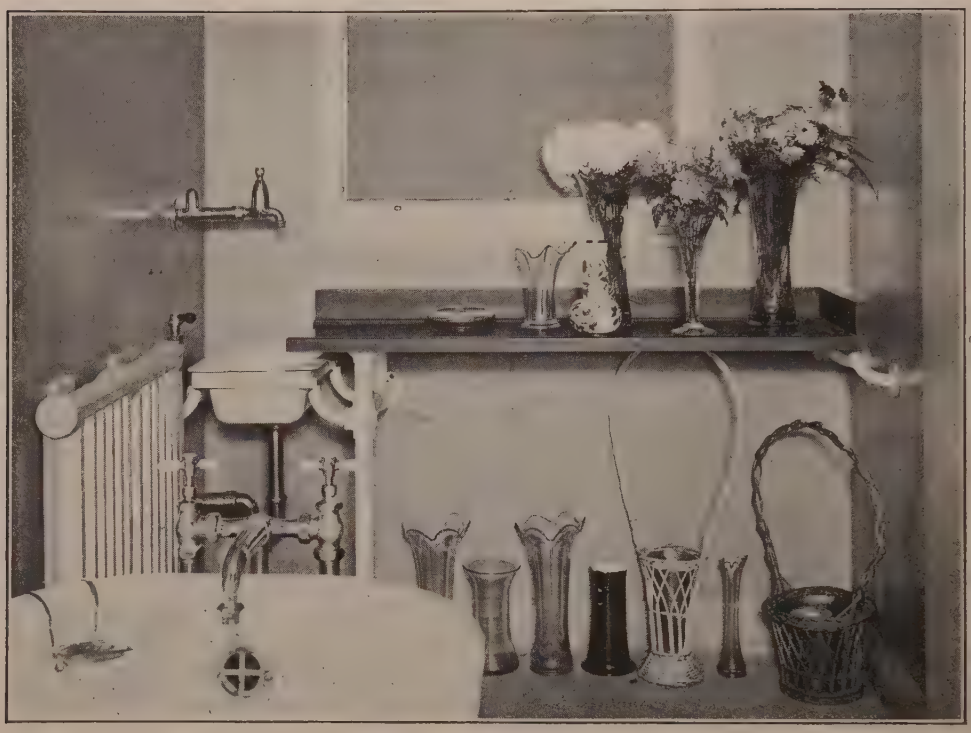


FIG. 583. FLOWER SINK

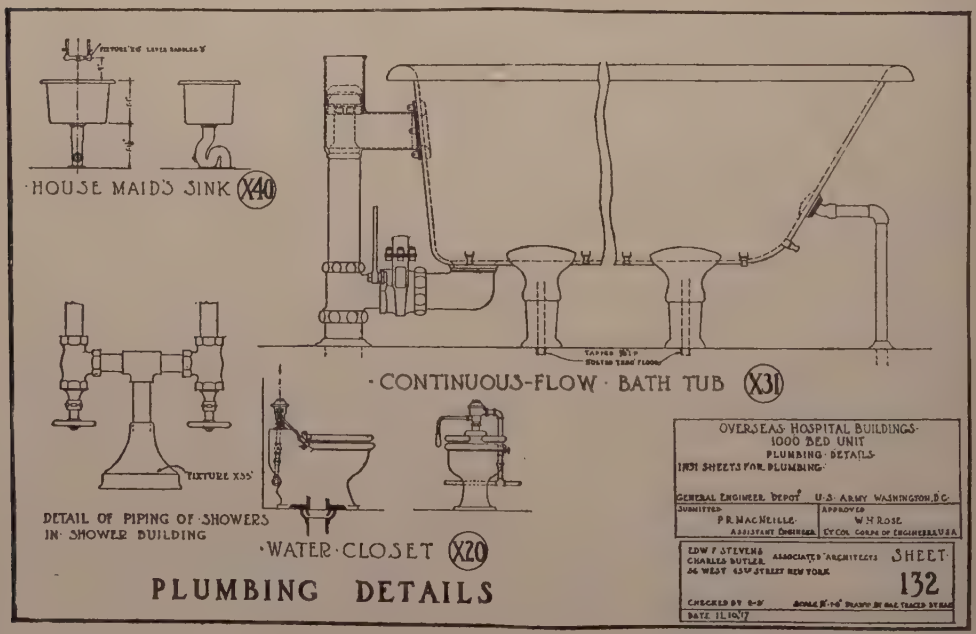



FIG. 584. PLUMBING FIXTURES DESIGNED FOR ARMY HOSPITAL

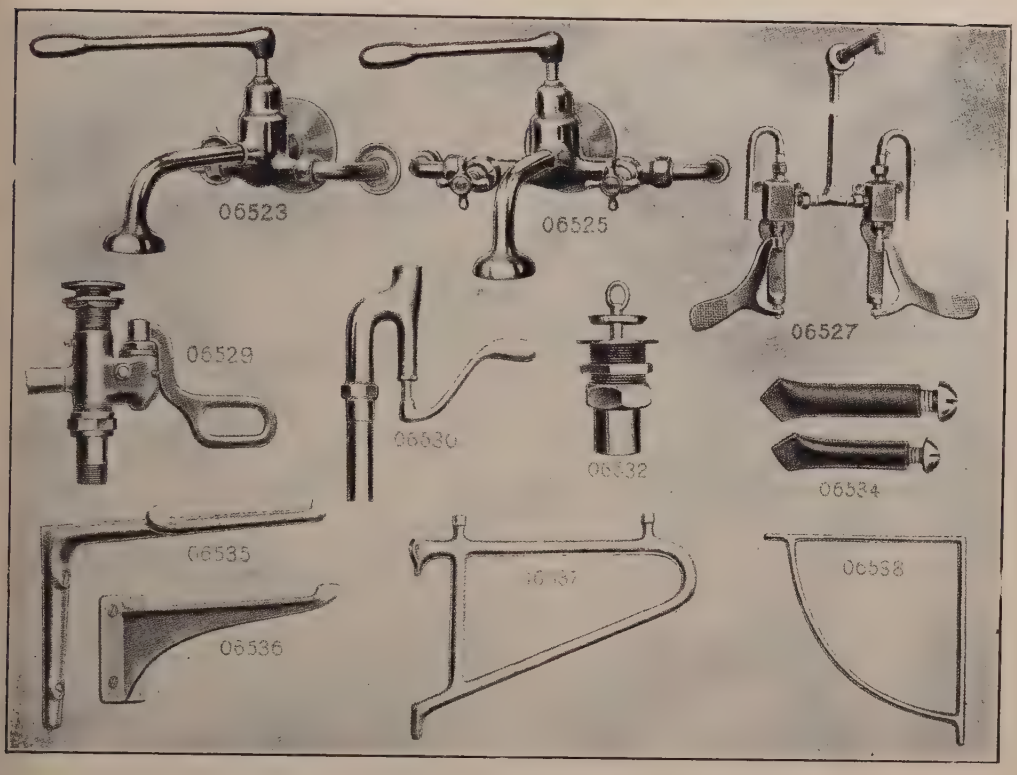



FIG. 585. A PAGE FROM A SWISS PLUMBING CATALOGUE

any other building of like grade; but the actual fixtures should be selected or designed for the purpose for which they are to be used.

They should be designed for hospital purposes, as it is very difficult, if not wholly impracticable, to adapt house fixtures to hospital demands. As a rule, the fixtures should be of the best quality, since they have more and harder use than those in other buildings; cheaper fixtures are usually more expensive in the end.

Hospital plumbing should be standardized as far as possible.

Where practicable, fixtures should stand clear of the walls to facilitate cleaning and to prevent vermin from finding a lodging, and the wall immediately behind the fixture should be protected with tile placed flush with the adjoining plaster. If this is done, the ill effects of spattering will not be serious.

The plumbing trap, in our modern times, is the one necessity of every plumbing fixture which has the reception and discharge of liquids into the drainage system. It can readily be seen, if the hygienic condition of our fixtures be considered, that this trap should have two possibilities—

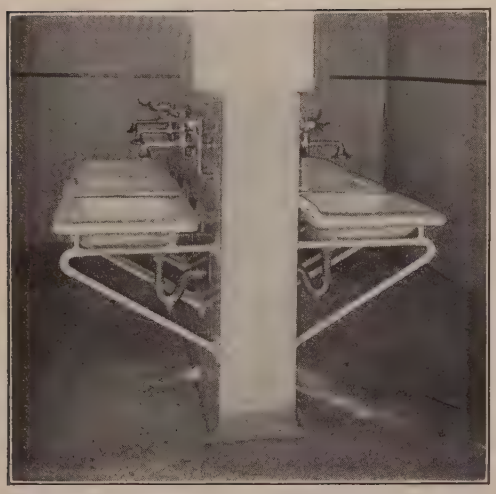


FIG. 586. SURGEONS' SCRUB-UP, OHIO VALLEY GENERAL HOSPITAL, WHEELING, W. VA.

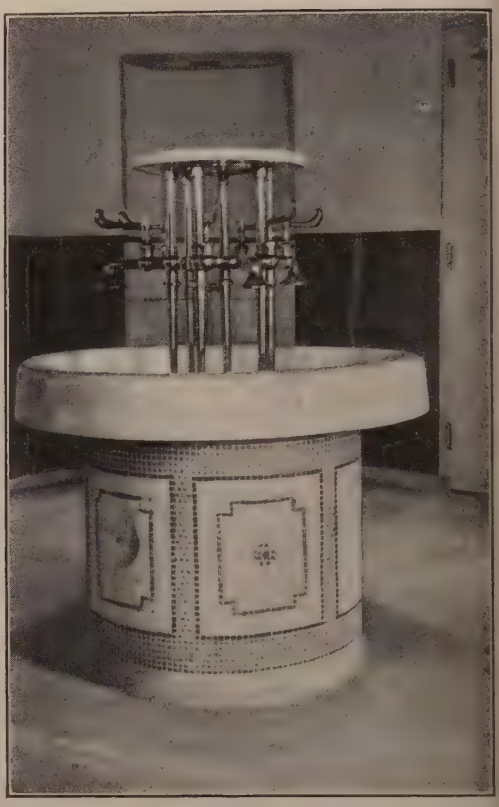


FIG. 587. SURGEONS' SCRUB-UP, CHOATE MEMORIAL HOSPITAL, WOBURN, MASS.
Edward F. Stevens, Architect

FIG. 588. SINK FOR ISOLATION WARDS, SHOWING ELBOW VALVE AND FLOOR DRAIN

FIG. 589. AUTOPSY TABLE, SHOWING DRAIN TOWARD OUTSIDE OF FIXTURE

(a) To safeguard properly the escape of sewer gas or sewer odor into the room;

(b) To be so constructed that the *inside* as well as the outside, or at least the inside to the water line, shall be accessible for frequent cleaning.

To do this latter readily, the trap must be set close to the fixture, and have a removable strainer for cleaning. Few medical institutions, even, have traps accessible in this way. And still how important this feature is! Of course every trap should be vented or have some anti-syphon device, but the local plumbing law generally governs this feature.

Overflows constitute another filthy, unhygienic condition that exists in nine out of every ten bowls, sinks, or bathtubs in general use. These are generally built integral with the china or iron, never

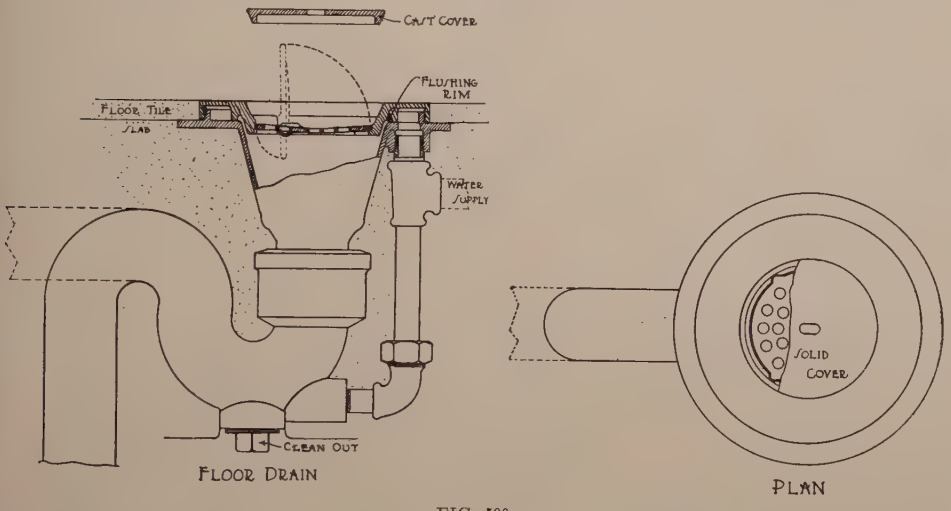



FIG. 590

smooth at best, and rarely get-at-able in any way. The construction of all bowls and sinks should be simplified by the use of the celluloid standpipe, which is light and easily cleaned; or the full, open overflow, with strainer, or similar device. In the double sink, if the partition is a little lower than the sides, one sink serves as an overflow for the other.

The washing in running water, required by certain religious sects, is really the ideal of cleanliness.

The piping requiring polishing should be reduced to a minimum, for the care of brass work is a considerable item of expense in a large institution. Where polished brass is desired, yellow metal should

FIG. 591. MARBLE AUTOPSY TABLE, WITH SINK ATTACHED

be specified. Heavily nickel-plated pipes and fixtures wear well. Pipes and fittings finished in white enamel, properly applied, are very satisfactory. The traps and less conspicuous parts may be bronzed or painted, saving considerable expense.

The new type watercloset, hung from the wall (where the construction will permit), is a great improvement over the old styles, and is being used in many institutions. The material selected for seat is important; if covered with celluloid or some other acid-resisting substance and cut away in front, it is much more hygienic. The cover, as a rule, should be omitted. The flushing can be accomplished either by a flushing valve, low-down or high tank so long as it works properly. The water seal, quiet action, and appearance are all questions to be considered.

The slop sink in the work room is used largely for the emptying and cleansing of bed pans and urinals, and the fixture should be so planned that this can be accomplished quickly and easily. To do this, the hopper must have a large, unobstructed outlet like that of the watercloset; it should slope quickly to the outlet; means of cleansing

the inside must be provided, either by a flushing rim or a short piece of flexible hose, or both, the hose being the simplest method of cleansing the inside of the utensils. The fixture should be set high enough so that the work can be done without stooping. If a sterilizing hopper is wanted, secure one in which *all* the contents can be sterilized, and one which can be easily cleaned and repaired.

Many of the so-called "clinic" hoppers are simply a complicated mass of valves, pedals and sprays, which need a mechanician to operate and keep in order. The simpler the fixture (Fig. 578), the more effectual it is.

Fig. 579 shows a bed-pan washing device for use in toilets off private or isolation rooms, using the water-closet as a hopper. The water outlet is so designed that when turned against the wall it does not drip. The closet is large enough to hold the bed-pan which is being washed.

Bath tubs for patients should be set up from the floor for two reasons—facility of cleaning underneath, and ease in bathing if nurse or attendant needs to assist. The inlets should be large, allowing the full discharge of hot and cold water at the same time. The type of inlet used on ocean steamships allows of quick filling. The overflow, if any, should be easily cleaned; but in most cases, there is no need of an overflow. A plug or standpipe and not a "flow-back" form of concealed standpipe should be used. The celluloid standpipe, which is light and easily cleaned, is less likely to cause damage if dropped.

It is the opinion of many hospital administrators that the only way to be sure that a patient is thoroughly bathed is to use some form of shower bath. This may be a shallow tub or bathing slab, set high but within easy reach of the attendant, the patient being washed in clean, running water by means of a hose and spray, the tub or slab becoming merely a drain for the water. In this way all of the dirt goes directly to the drain and is not diluted and used again on the body. This form of bath (Fig. 575) should be used with entering patients, particularly in the contagious and children's departments. In many of the European hospitals for women this form is the only one used. The same principle serves in the portable tub (Fig. 280) described in Chapter IV. Provision must be made in the plumbing, however, where this form is used, for a suitable floor drain and a hose connection to the room fixture.

The principle of the high, shallow tub or slab is quite generally used in bathing children (Fig. 576) and infants. In both cases some reliable temperature-controlling device should be placed on the sup-

ply or a separate storage tank placed directly above the bathing slab. This tank should have a visible thermometer and water gauge. The use of the spray can be facilitated where there is a storage tank by using a self-closing spray head.

The infants' bath is naturally smaller than the children's, and the slab may be heated by admitting hot water to the closed space in the porcelain directly under the slab.

The wash bowl or lavatory now placed without restraint in the patients' rooms and the open corridor, as well as in the toilets and wash rooms, should be designed on the same simple lines suggested for other fixtures.

The non-concealed overflow, the removable strainer, and the high trap, all are desirable features; in fact, in nine cases out of ten the stopper can be eliminated if a combination faucet is used; for, once accustomed to washing under running water, the filled bowl and washing in dirty water will be abandoned.

For ward bowls, bowls in corridor, and bowls for scrubbing up for dressings, the wrist or elbow mixing-valve may be used to advantage (Figs. 580, 582).

Where it is desirable to fill the bowl, a standpipe of celluloid, made to fit the opening, gives an easily cleaned overflow.

Fig. 581 shows the construction of such a lavatory.

Fig. 580 shows a simple, inexpensive lavatory, with a combination faucet having quick-movement valves, and an elbow or wrist handle. The trap is close up, the overflow not concealed. This is adapted for general use, or for scrub-up purposes. Another good lavatory is shown in Fig. 582.

Fig. 584 shows several simple plumbing devices which were planned to be used in the United States overseas army hospitals. Special attention is called to the continuous-flow bath tub (X31).

The scrub-up for the surgeon, as a preparation for operation, has undergone various changes: from the foot valve, good at times but depending on an even pressure of the foot of the surgeon to produce an even flow of an even temperature; then various forms of the knee valve, dependent upon a mixing valve for the temperature, without regulation of flow; up to the simpler elbow or forearm control. Again we find that the work of the European specialists has given us models from which to work. A page from a Swiss plumbing catalogue (Fig. 585) shows a variety of simple forms of both foot and elbow action valves. For the scrub-up for a number of surgeons, the long sink with several sets of outlets has proved satisfactory. Single bowls, set

together on one central screen, as at the Ohio Valley General Hospital (Fig. 586) or the Youngstown Hospital, allows of easy access. In the smaller hospital this same idea may be carried out with a raised basin in the center of the operating rotunda, as at the Charles Choate Memorial Hospital (Fig. 587); for, with the combination non-hand-touching valve, all that is needed is sufficient spillway for the water. This form of scrub-up valve placed over the work-room sink gives an additional place for washing. It may be placed over a simpler sink in infectious wards, allowing for the special cleansing of the nurse's hands and the giving of the baths in the portable tubs (Fig. 588). (See Chapter VIII.)

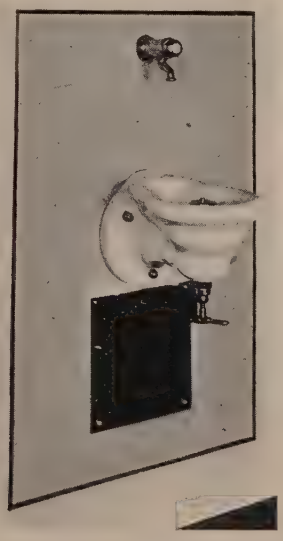


FIG. 592. "BUBBLING" DRINKING FOUNTAIN, FOR HOSPITAL CORRIDORS

The floor drain, highly important in certain sections, may be a menace to health unless properly constructed and kept filled with water. For operating and autopsy rooms a flushing rim trap is desirable. This top should be solid, to resist the movement of heavy furniture (Fig. 590).

The autopsy table is generally made a part of the plumbing, and a simple fixture which has proved satisfactory is shown herewith (Figs. 589 and 591). The center is the highest part, allowing the fluids to flow away from rather than toward it. A small sink, made integral, is provided. A simple means of flushing is obtained by using a flexible hose pipe, into which a copper wire is inserted. By

means of this the end of the hose may be made to remain in whatever position it is placed, allowing the flushing action to go on without interruption.

The drinking water problem of the hospital has been solved in various ways by various hospital men. There should be a goodly supply of pure water easily procurable for the patient, for the nurse, for everybody.

The system used by the writer at the Ohio Valley General Hospital and at the Royal Victoria Hospital is to distill all the water for drinking and clinical purposes.

On each floor outlets were provided where the water is cooled, installing a fountain for patients' use (Fig. 592).

This fountain is provided with an outlet for drawing water into a receptacle as well.

# CHAPTER XIX

## DETAILS OF CONSTRUCTION AND FINISH

THE exterior details of the hospital should be made to conform to the style of architecture in which the building is designed and should be left to the architect, it being borne in mind that the detail and exterior treatment should be subservient to the plan; in other words, the exterior should be designed around the plan, and not the plan made to suit the elevation as is so often the case. Economy in construction can be realized by establishing units in the planning, by having the partitions continuous and the plumbing of one story near that of the others.

The interior finish, especially in the patients' rooms, should be carefully studied from the economic and hygienic sides. Projecting surfaces are difficult to keep clean and should be eliminated as far as possible. If the door jambs are made of steel pressed to a suitable form, with angles rounded, and are set to form a ground for the plasterer, there will be no projection. To avoid the usual sharp angle at the junction of the door jamb and the floor, the door stop should be omitted for a few inches above the floor and the coved base allowed to run through the jamb (Fig. 594). If the door jamb is of wood, the same general detail can be used; and to protect against the slight sinkage of plaster, a small oval wood or metal strip can be used (Fig. 595). Transoms, where used, may be the thickness of the door, and the usual projection avoided.

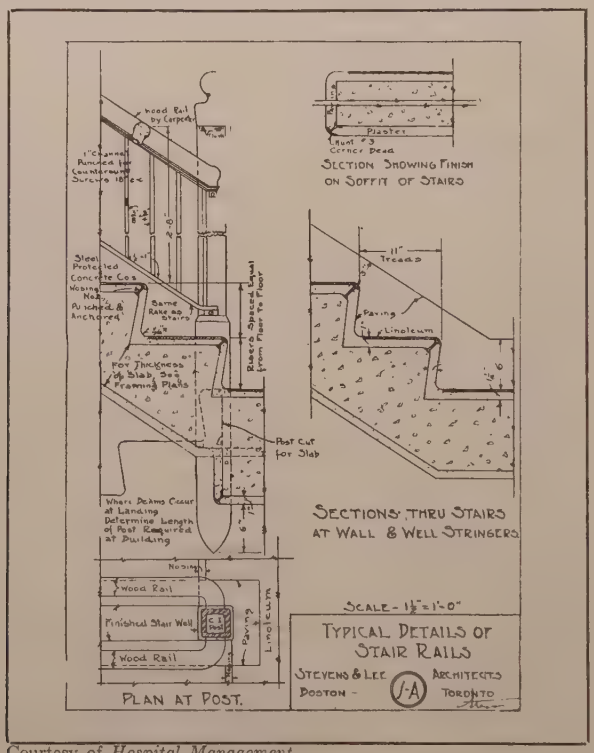
Fig. 596 shows the detail of a door frame in a thin (two-inch) solid partition. It can be used to advantage in separation between rooms, or in store-room partitions.

The base around the rooms can be made of the floor material or of tile, marble, metal, wood, or any enduring material, depending on the appropriation and the individual preference; but if coved at the juncture of wall with floor, made flush with the wall line, and carried through the door jamb of the same material, the hygienic qualities are enhanced. To prevent the furniture from marring the walls, a furniture shoe formed in the base, three of four inches from the wall, can be used to advantage. Bases and door jambs of this type are set before plastering, so that every part of the finish is smooth with the wall.

Windows should be placed low enough so that a patient in bed can readily see out upon the street. The same character of finish

should be applied to windows as to doors. It has been found that the direct draft from a slightly opened window may be diverted if a deflector is placed in front of the opening. This can be formed in the window frame and so become permanent (Fig. 597).

The "full-view" casement window shown in Figs. 598 and 599 is particularly adapted for solaria and for airing balconies which it is desired to close occasionally. This method of hanging permits the sash to be opened about 80 per cent. of the whole, giving practically




Courtesy of *Hospital Management*

FIG. 593. DETAIL OF STAIRS

the effect of a wide-open balcony. The sashes opening out simplifies the screening problem, since it may be accomplished with sliding screens.

This also solves the very troublesome problem of washing the outside windows.

Fig. 600 shows a window of which the special advantage is that it has a hinged sash swinging in, with a cheek piece at either side, so that the incoming air is deflected toward the ceiling. This window was originally designed for war hospitals, but is equally adapted to

permanent structures. It is suited to any sort of ward or room, and is excellent for crowded wards where it is difficult to secure ventilation without drafts.

Its disadvantage is the difficulty of getting at outside blinds or screens; but by placing a small sash at the bottom, as in cut, access is gained to outside blinds, awning adjusters or screens; this may also become a bottom ventilator.

The hardware required for it is of the simplest sort; two friction hinges, and a snap catch on each section, and at the side a chain to keep the sash from going beyond the horizontal, with a screw hook to catch a link of the chain if one wishes to drop it only part way.

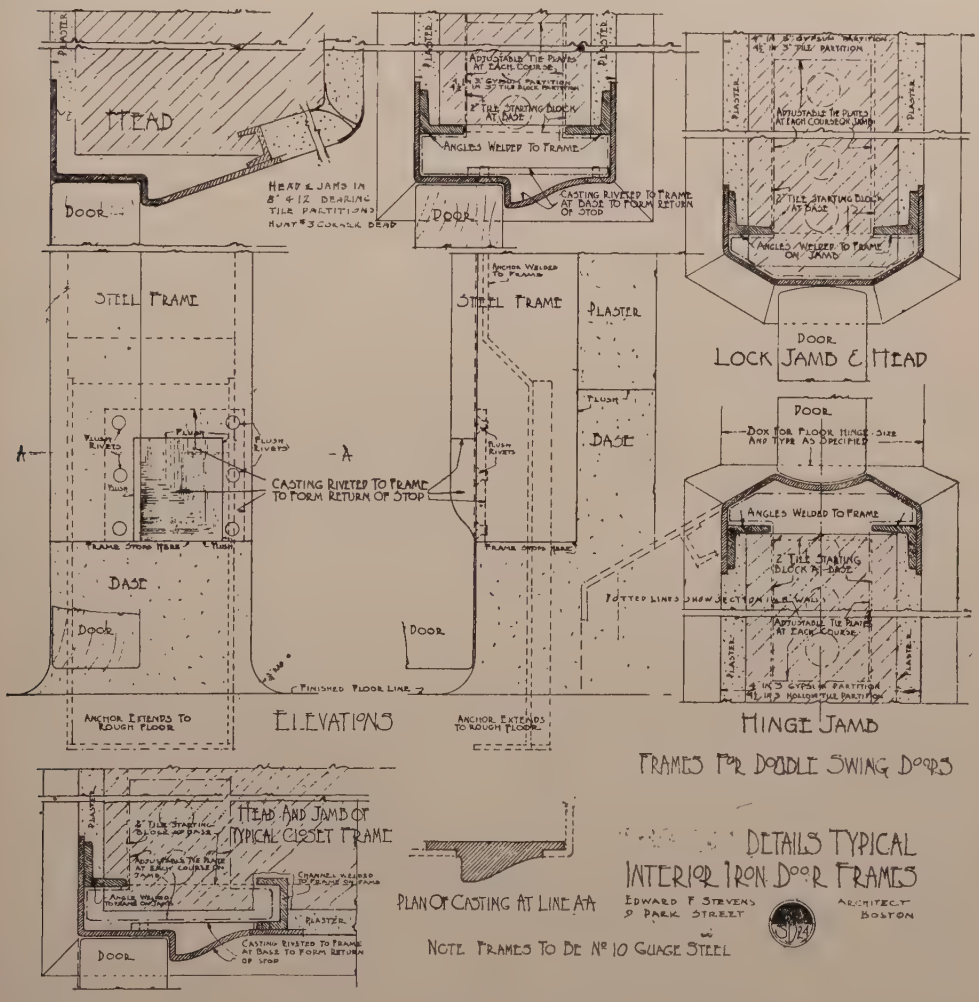

HEAD
DOOR
PLASTER
HEAD & JAMB IN 8" & 12" BEARING TILE PARTITIONS HUNT #3 CORNER BEAD
ADJUSTABLE TIE PLATES AT EACH COURSE
2" TILE STARTING BLOCK AT BASE
ANGLES WELDED TO FRAME
CASTING RIVETED TO FRAME AT BASE TO FORM RETURN OF STOP
ADJUSTABLE TIE PLATES AT EACH COURSE ON JAMB
2" TILE STARTING BLOCK AT BASE
ANGLES WELDED TO FRAME ON JAMB
LOCK JAMB & HEAD
STEEL FRAME
ANCHOR WELDED TO FRAME
BASE
FLUSH RIVETED
CASTING RIVETED TO FRAME TO FORM RETURN OF STOP
FRAME STOPS MADE
DOOR FOR FLOOR HINGES - SIZE AND TYPE AS SPECIFIED
ANGLES WELDED TO FRAME
2" TILE STARTING BLOCK AT BASE
DOTTED LINES SHOW SECTION IN 8" WALL
ADJUSTABLE TIE PLATES AT EACH COURSE
3" IN 8" GYPSUM PARTITION 4½" IN 5" HOLLOW TILE PARTITION
FINISHED FLOOR LINE
ANCHOR EXTENDS TO ROUGH FLOOR
ELEVATIONS
HINGE JAMB
FRAMES FOR DOUBLE SWING DOORS
HEAD AND JAMB OF TYPICAL CLOSET FRAME
CHANNEL WELDED TO FRAME AT SIDES
CASTING RIVETED TO FRAME AT BASE TO FORM RETURN OF STOP
PLAN OF CASTING AT LINE A-A
NOTE FRAMES TO BE № 10 GUAGE STEEL
DETAILS TYPICAL INTERIOR IRON DOOR FRAMES
EDWARD F. STEVENS 9 PARK STREET
ARCHITECT BOSTON

FIG. 594

All angles, whether wall, floor or ceiling, should be coved.

Doors should be smooth, without moulding. The no-panel slab doors are desirable; or if these prove too expensive, the one panel, or at most two-panel, door can be used. All doors of wards, patients' rooms and balconies should be wide enough to permit the passage of a bed, three feet eight inches or four feet.

Fig. 601 shows the construction of a pivot door which may be used to close alternately two adjoining doors. Its special use is in intercommunicating baths between two private rooms, as in Fig. 66.

Walls back of all plumbing fixtures should be tiled, with the tile on the same surface and even with the plaster. The walls of toilets, sink rooms, serving kitchens, laboratories, and similar rooms subject to much use, should if possible be tiled to a height of five feet or more.

Stairs should be fireproof, and easily cleaned.

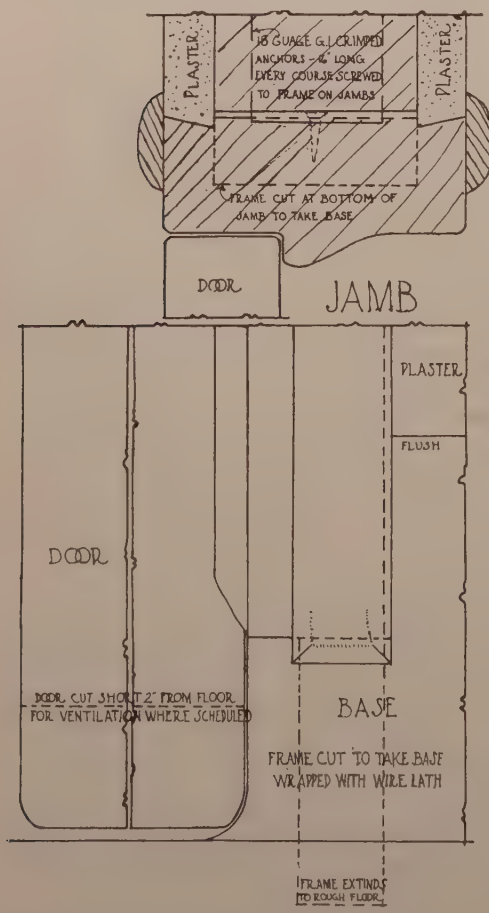

PLASTER
18 GUAGE G.I. CRIMPED ANCHORS — 6" LONG EVERY COURSE SCREWED TO FRAME ON JAMBS
PLASTER
FRAME CUT AT BOTTOM OF JAMB TO TAKE BASE
DOOR
JAMB
PLASTER
FLUSH
DOOR
DOOR CUT SHORT 2" FROM FLOOR FOR VENTILATION WHERE SCHEDULED
BASE
FRAME CUT TO TAKE BASE WRAPPED WITH WIRE LATH
FRAME EXTINDS TO ROUGH FLOOR

FIG. 595. WOOD DOOR JAMB

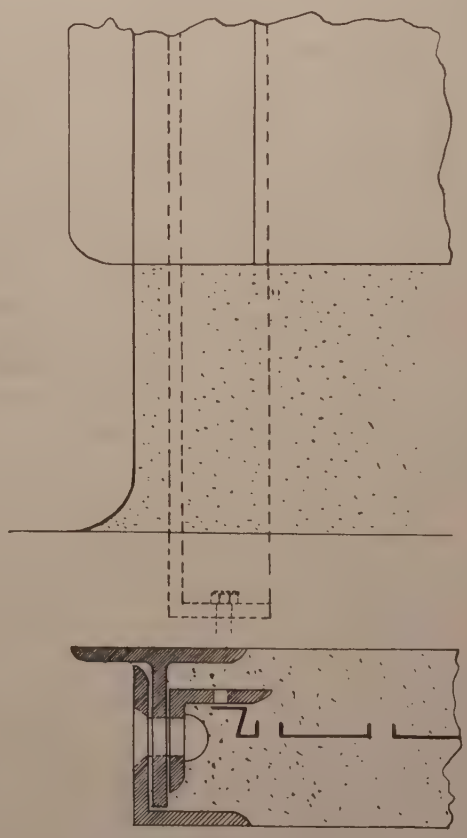


FIG. 596. METAL DOOR JAMB FOR 2-INCH SOLID PARTITION

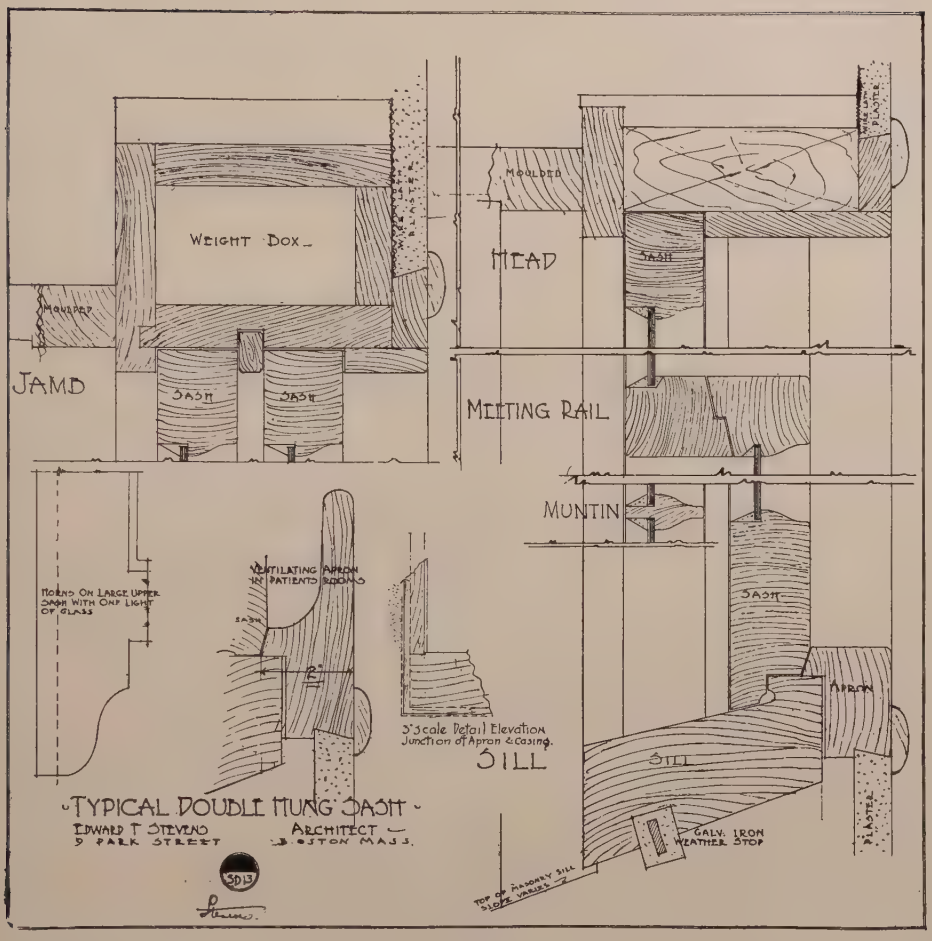



FIG. 597

Fig. 593 gives the detail of a simple form of concrete stairs, the tread being made resilient by an insert of linoleum cemented in place.

An elevator should always be provided, even in a two-story building. It should be long enough to take any stretcher and wide enough for a bed and one or two attendants. The automatic elevator is probably best suited to small hospitals, or one with combination automatic and lever control. An automatic levelling device is a most important adjunct to a hospital elevator.

Medicine closets for each unit (Fig. 602), built into the wall, should have no re-entering angle. They should have a small sink, with hot and cold water, and slab, with tiling at the back, shelves of plate glass or metal, artificial lights, towel rack, etc. If the unit is

small, a built-in medicine closet at or near the corridor bowl can be substituted (Fig. 603).

The clothes closets for private rooms or wards (Fig. 571) should be built like the medicine closets. If the closet door is cut two inches short at the bottom, the vent for the room may be placed in the closet ceiling, and the ventilation of both room and closet accomplished. (See Chapter XVIII on heating and ventilating.)

FIG. 598. FULL VIEW WINDOW

Fixed equipments such as linen closets, kitchen cabinets, etc., should be constructed so as to leave a free space behind them. The linen closets should have open shelves or racks, so built that they are removable for cleaning (Fig. 604); if the top is sloped, the minimum amount of dust is accumulated (Fig. 605).

Fig. 606 shows a booth designed for the giving of nasal and throat treatments in the out-patient department. Its size is but 3 feet 8 inches by 4 feet 6 inches. The screen partition is of metal, enamelled, the

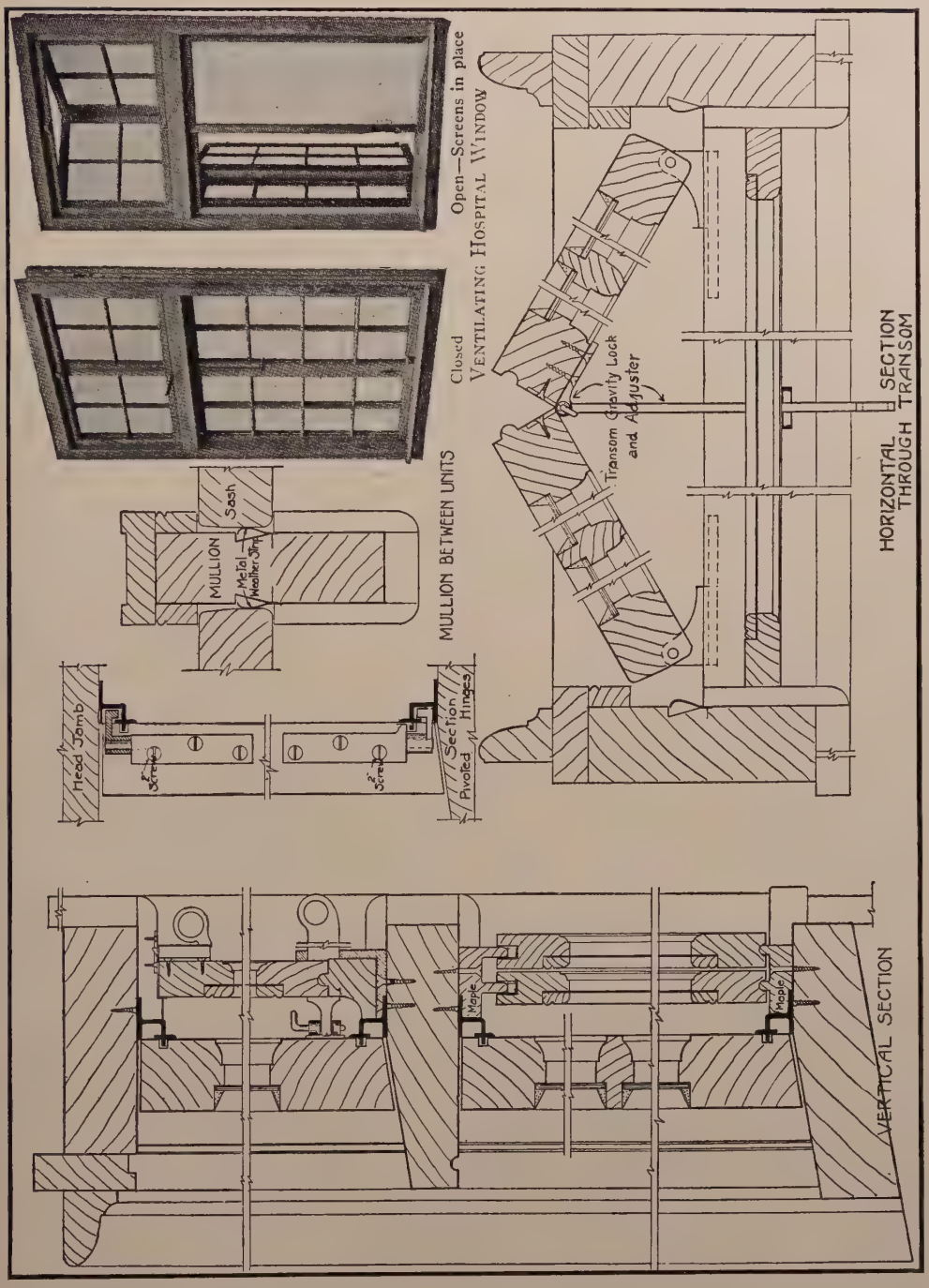



FIG. 599. FULL VIEW WINDOW DETAIL

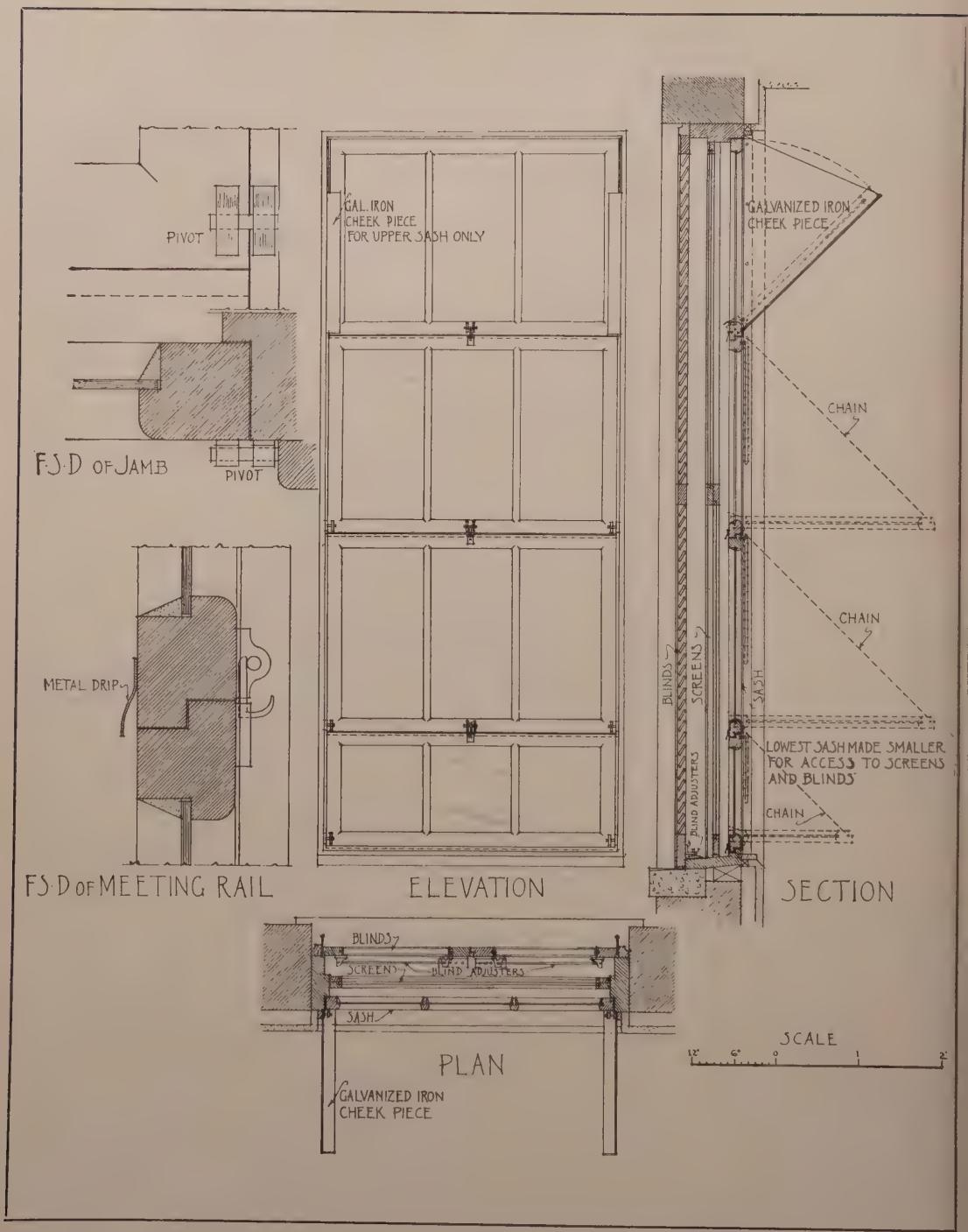



FIG. 600. DETAIL OF WINDOW USED IN ARMY HOSPITALS
Charles Butler, Architect

table top of the same material. There is an electric instrument sterilizer, an adjustable lamp, a special small bowl with running water, a rack for bottles, an extra shelf for supplies, etc.

Hardware is a small but very important item, and should be carefully selected with an eye to its suitability for hospital purposes. Unsuitable, noisy hardware has been the cause of more disturbance to patients in an institution than almost any other item in the construc-

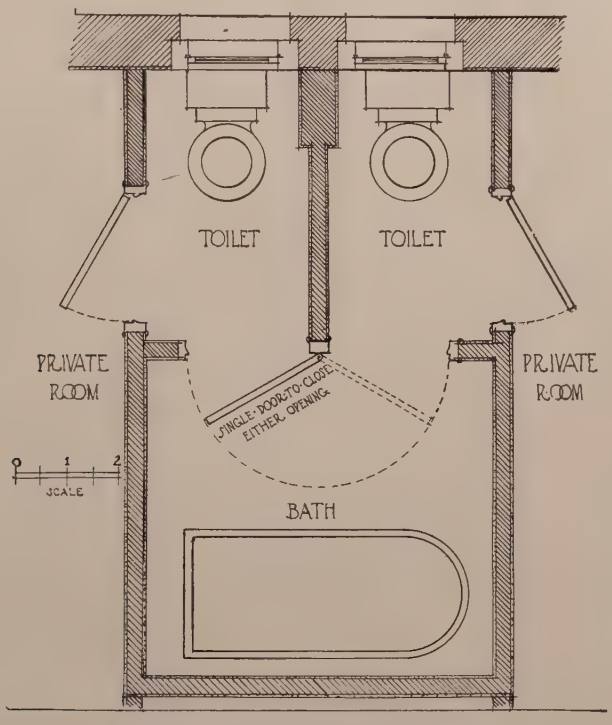



FIG. 601. PIVOT DOOR SEPARATING BATH FROM TOILETS IN PRIVATE SUITE

tion. How often one sees the latches "muzzled" with a towel or special pad which slips around the knobs, or covered weights placed behind the door to prevent slamming! Hardware suitable for a dwelling, an office building, or a theatre is not suitable for a hospital.

How often the nurse, with both hands full, is annoyed and delayed in opening the door with the round knob! And how often the closing of the same door awakens or annoys the patient!

Door knobs are also a definite source of infection. They are particularly dangerous where cases of communicable disease are cared for.

The opening of the door with both hands full can be accomplished

with the angle door handle, and this is a good device where noise does not enter into the problem, as in service buildings; however, in psychopathic wards the handle should have no shank and should be turned down instead of up.

With an efficient checking spring and noiseless door holder, the

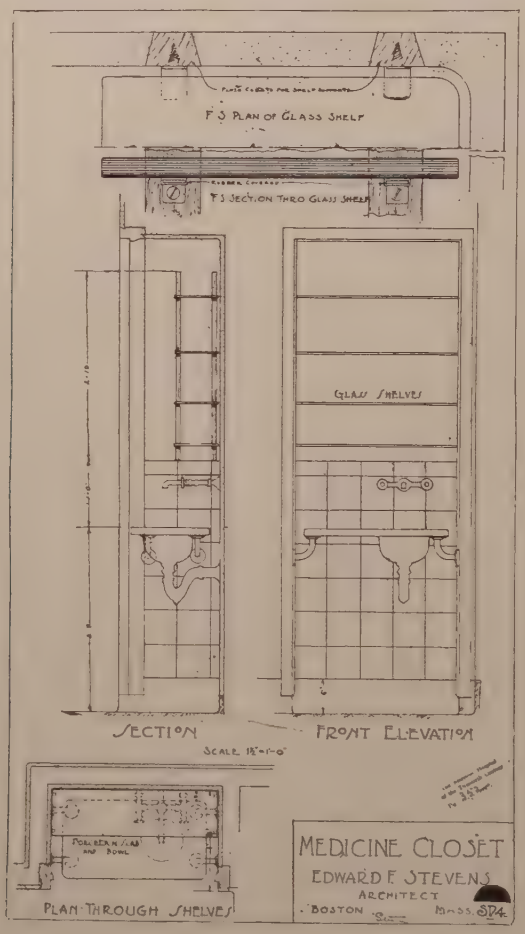



FIG. 602

latch bolt can be eliminated, and with it much of the noise from hardware; then, with the reversed hook handle (Fig. 607) placed on the inside of the door, one can open the door, with both hands filled, by slipping the forearm under the hook handle; and of course, with the latch eliminated, the door can be readily pushed open from the outside. For the occasional locking of the door, a dead bolt can be installed.

The hardware for the elevator doors should always run smoothly and afford protection against opening of doors when car is away from landing, but the silent feature should be emphasized in selecting this hardware.

With reference to floors, the persistent question, "What is the best floor?" is hard to answer. Among the leading architects and hospital men in Europe, the writer found the almost universal preference to be for tile, usually a light gray flint or vitreous tile, as large as four inches, laid with a fine joint and against a coved base of the same material. In America, with every available material and numerous

FIG. 603. MEDICINE CLOSET

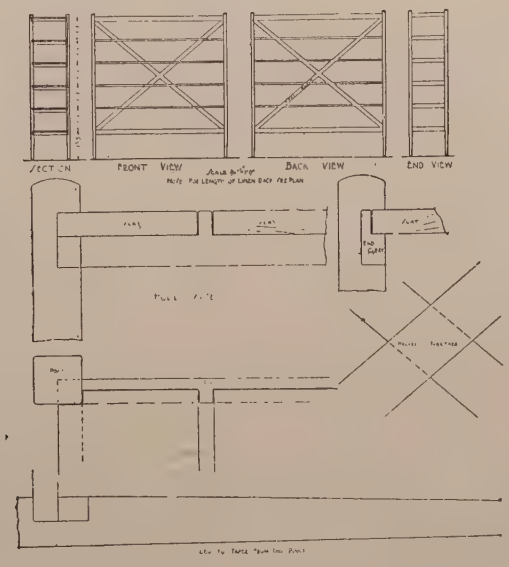



FIG. 604. LINEN CLOSET DETAILS

advocates of each, it becomes almost a case of individual preference. There are certain underlying principles, however, which should be considered:

(a) Fitness for location.
(b) Durability.
(c) Artistic effect.

The patient's room should have some resilient material, quiet in color and reasonably non-absorbent; resiliency and durability should be considered for the corridor; and durability and non-absorbent qualities for the utilities.

Good results may be obtained with hardwood floors and perhaps they are as popular today as any other floor. With the fire-

proof buildings, however, the demand is for a floor of fireproof material.

Of the monolithic floors, terrazzo gives perhaps as good results as any simple, inexpensive floor; two colors may be used, one for the base and border and one for the field, with a dividing line between of single marble tessaræ. Some of the magnesite floors are giving good results, when properly laid. This can be put down in contrasting colors and the artistic effect is pleasing. Under certain conditions—for example, when laid in kitchens and toilets, where very hot

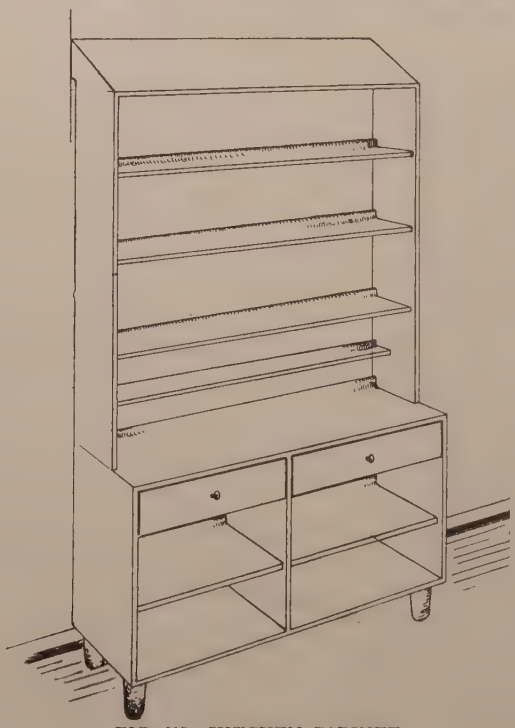


FIG. 605. KITCHEN CABINET

water may be spilled—this material is apt to disintegrate and to spot badly.

Quarry tile makes a good wearing floor in the service part of the hospital and for roof wards and airing balconies, and is artistic as well.

Where strict economy must be practiced, a good quality of cement floor, properly treated to prevent dusting, serves its purpose well.

All the asphalt floors should be avoided excepting for special places like portions of laboratories, refrigerators, etc., where an acid-proof floor is required.

Hard, fine-grained marble makes a most excellent operating room

floor. Opalescent glass has been used more or less successfully for the same purpose.

For corridor floors, where there is much traffic, probably the best material is pressed cork tile. This is quiet, resilient, and wears well. Cork tiling and rubber tiling have been used in toilets and baths, but they possess little advantage over terrazzo or magnesite.

For wards and private rooms, wood floors are cheap and look well, but are open to many objections. They shrink and swell, have many cracks to gather dust, and need constant refinishing. Maple is undoubtedly the best wood floor material for a hospital.

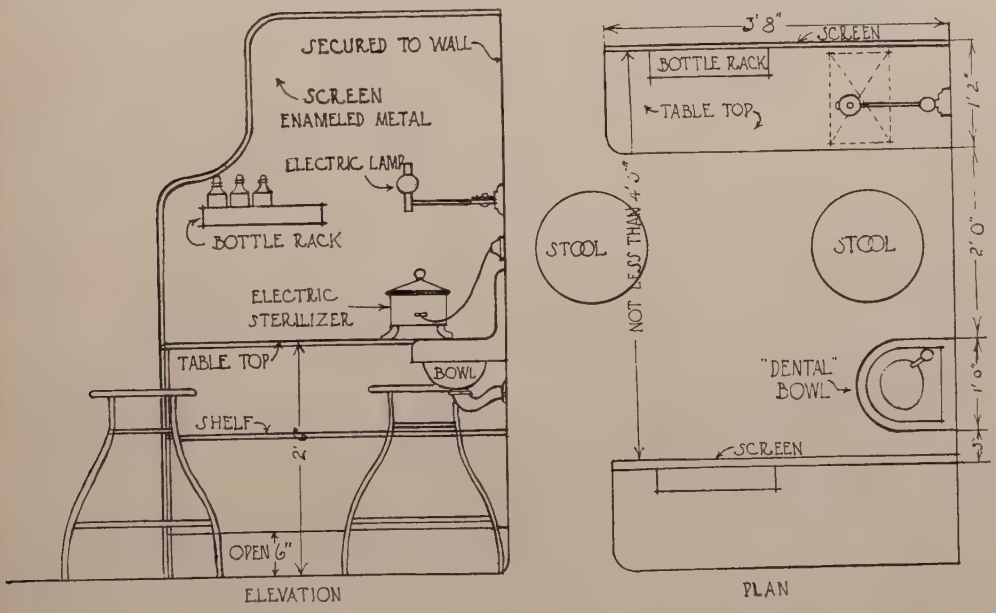



FIG. 606. NOSE AND THROAT DEPARTMENT TREATMENT BOOTH

Almost everywhere in Europe linoleum is used for the floors of patients' rooms and wards, and its use is growing in favor in this country. It can be used not only for floors, but for stair treads, table tops, screens, and even for door panels. When properly laid, it is doubtless the most satisfactory material which can be found. Great care must be taken to have the floor underneath smooth and dry, and the material must be thoroughly stretched and laid upon the floor for several days before being fastened down, then cemented to the construction, the cement being applied to the entire under surface. If the newer colors and patterns of linoleum are used, the effect is very pleasing.

Too much care cannot be taken in the planning and arrangement of artificial illumination, especially for the rooms occupied by patients. The eye, at all times a delicate organ, becomes more sensitive in sickness. Beds should be so placed as to shield the patients' eyes in the daytime, which means that they should not face the windows. In open wards, this is avoided by the use of cross screens, as shown in the Bridgeport Hospital (Fig. 192) and in St. Luke's Hospital (Fig. 200). For night lighting, direct ceiling lights should be avoided; instead, reflected or obscured lights should be used, which give a soft glow over the whole room, with no bright spots. These ceiling lights can have lamps for greater or less illumination in the same fixtures;

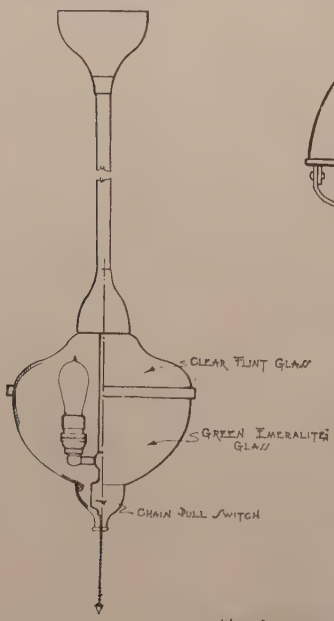



FIG. 609. DETAIL OF WARD LIGHT

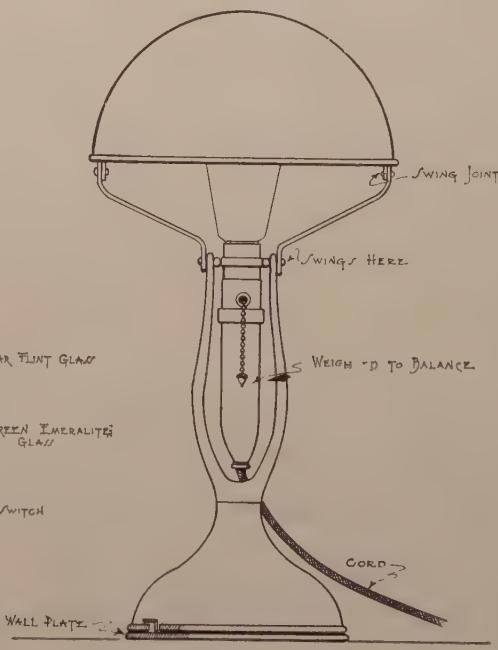



FIG. 610. PORTABLE BEDSIDE LAMP

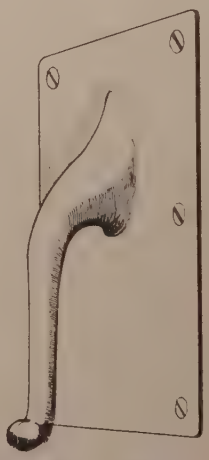


FIG. 607. DETAIL OF HOOK HANDLE FOR DOORS

and with the low-candlepower lamps used for night service, the lamps can be rendered less disturbing to the patient by dipping in blue stain.

For corridors and wards, a low-power lamp, placed in a recess near the floor, is often sufficient and does not disturb patients. The fixture placed near the ceiling, with an opaque or opalescent reflecting globe placed below the light, directs all the rays to the ceiling, and thence diffuses them through the room. The bowl-shaped fixture should be covered with a tightly fitting sloping glass top to keep out the dust and to allow of its easy removal (Fig. 609).

In addition to the ward or room lighting, there should be a wall outlet at each bed, where a portable table or wall lamp can be attached (Fig. 610). The wall outlet may be used also for an electric fan, electric heating pad, etc.

Standards are being created for the proper electric wiring of hospitals. So far as insulation, quality of material, and general equipment are concerned, the requirements are similar to those of any other first class building, but the special needs of a hospital demand the application of special standards. The electric outlets are subject to

FIG. 611. OPERATING ROOM, QUINCY CITY HOSPITAL, SHOWING RADIATOR SHIELD AND CRANE LIGHT

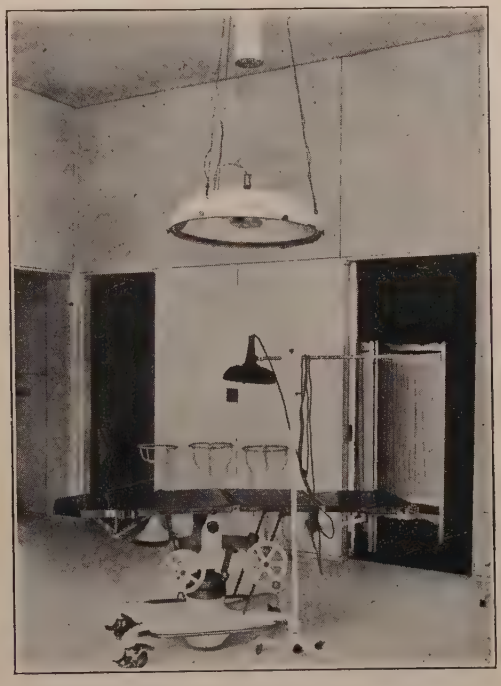


FIG. 611A. TYPE B SCIALYTIC LIGHT

use for light, for power, for heating and for sterilizing; hence, capacity of wire in excess of that needed for lighting should be provided. With the need of night lights in the patients' rooms and wards, it is advisable to have a double circuit to the general outlet, and the switch so designated; this can be made plain by using a "radiolite" button on the night light switch.

The bedside outlets, such as emergency light, nurses' call, telephone, etc., should be so located as to allow a certain latitude in the placing and moving of the bed; for the appearance of the room and for convenience, they should be placed at a uniform height and as near together as possible.

The artificial illumination of operating rooms needs most careful study. Rooms have been successfully lighted by rows of lights around the outer wall or on the ceiling near the wall; by a more concentrated light in the center with a bowl-shaped reflector; or by a fixture with several arms wide apart, so placed as to overcome shadows.

A large fixture over the operating table is sometimes objectionable on account of its tendency to catch and distribute dust. A fixture using a combination of light-house lens and reflectors has been successfully developed within the past few years, and the principle can be used both in a swinging bracket and the stationary ceiling light. A similar light can be successfully placed on a swinging crane, if preferred, which can be raised and lowered and swung entirely out of the way when not in use. (See Figs. 611 and 611A.)

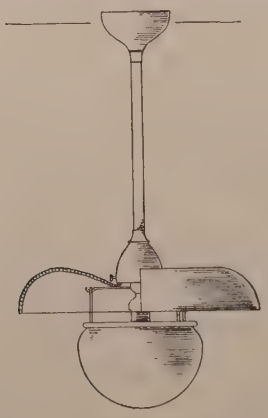


FIG. 612. OPERATING LIGHT

Concentrated light from powerful reflectors placed above the ceiling light gives very satisfactory results. (See Fig. 573.)

Fig. 612 shows an operating light which is a combination of direct and reflected rays. By placing these lights in at least four parts of the ceiling, one avoids having any fixture directly over the operating table, does away with the intense heat generated by high-power lamps, and practically eliminates shadows.

It is well to provide gas for an emergency light in the operating room. The enclosed drop mantle burner is satisfactory for the purpose. Emergency lights have been successfully made by the use of the Prest-o-lite tank, mounted on a portable tripod and surmounted by a reflecting lamp (Fig. 174).

A goodly supply of hand electric torches should be kept at the nurses' stations against need.

The Tungsten or Mazda lamp facilitates illumination, giving the maximum amount of light with a minimum amount of current.

For lights in the offices, kitchens, etc., nothing special is needed, except to secure a fixture which has simple lines and from which all dust-catching ornamentation is omitted and which will give proper illumination.

The lights for the working portion of the institution should be so planned as to direct the light evenly over the objects to be handled. Open or uncovered lamps should generally be avoided.

The therapeutic effect of the color of walls, ceilings, and finish is very marked upon patients. There is, perhaps, no one thing in the details of a hospital which should have more study than the wall

FIG. 613. CLEANER FOR DRY MOPS

and ceiling decoration or color, not only of the patients' rooms, but also the entrance, the reception rooms, the sitting room, and even the kitchens and work rooms. Why should the patient of refined taste, accustomed to harmonious colors in furniture and walls at home, be subjected to ugly, inartistic hospital rooms? The walls should be of cheerful colors; the decorations, if any, should be refined. It is well to have diversity of coloring both in the walls and equipment. If the walls are painted a reasonably dark color to a height of five of six feet, and the ceiling color brought down to meet this

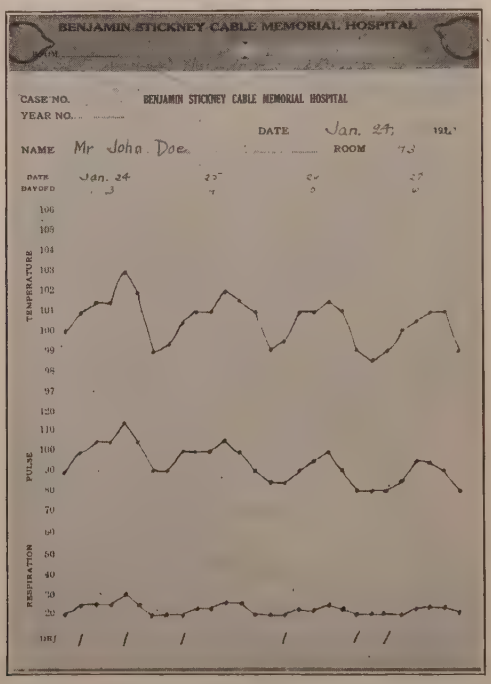



FIG. 614. PAPER CHART HOLDER AND CHART

line, divided by a band or simple stencil design, the effect is very satisfactory. If the color design is carried around the door and window frames, making an artistic flat decoration, so much the better.

The introduction of tile and mosaic at the back of plumbing fixtures and radiators gives a touch of color and in addition an element of cleanliness (See Fig. 197).

The walls of the children's ward may be made most entertaining for the little folks by using simple decorations of "Mother Goose" or "farmyard" pictures, pasted on the walls in the form of a frieze and made permanent by a coat of varnish; or prints of larger pictures

may be fastened to the wall in the same way; or, as mentioned in the chapter on children's hospitals, the walls may be decorated with Ceramic wall tile.

The day of white walls for operating rooms or any other rooms, let us hope, is past. The walls of the operating room, if of tile or marble, should not be white but of some tone which will not absorb too much light but dark enough to prevent eye strain on the part of the surgeon and attendants. If the walls are painted, the same argument will hold good.

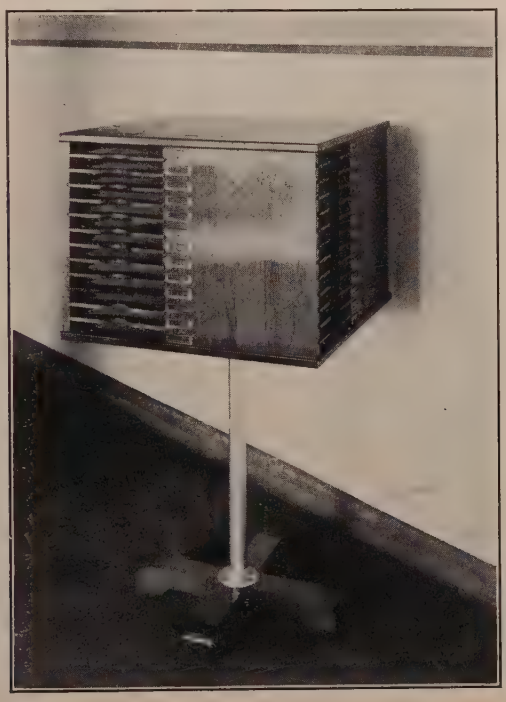


FIG. 615. REVOLVING CHART CASE

Many surgeons today wish the floors and lower portion of their operating room a very dark green, and use dark gowns for themselves and attendants, for the same reason—to prevent eye strain and to allow a better concentration on the subject to be operated upon.

With reference to nurses' calls, too much cannot be said in favor of doing away with the noisy system of electric bells. There are many systems of the so-called "silent call" on the market. All of them have merit. There are, however, essential points which should be considered in selecting a system:

1. The system should be simple and as nearly "fool-proof" as possible.

2. The part made accessible to the patient should be of non-metallic substance, with smooth lines, non-detachable and easy to operate.

3. The attachment to the wall should be of such a nature that if the connecting cable should be held by the bed-post and the bed suddenly moved, the entire system will not be disarranged; in other words, the "plug" to which the cord is attached should be readily removable, whether a straight or a side pull is exerted. This is a most important feature.

4. The resetting station should be within easy reach of the patients's bed; if on the wall, at such a height and location that the nurse can reset it without taking the time to go around the

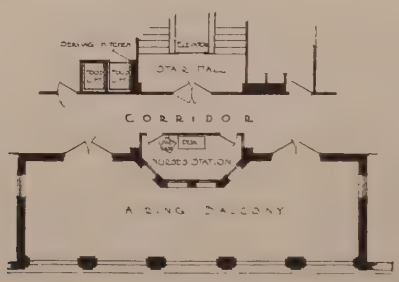



FIG. 616. PLAN OF NURSES' STATION

bed; if at the press-button itself, which is in the patient's hand, so much the better; but if the point of resetting is at the patient's hand, there should be some locking device so that the patient cannot easily cancel her own call.

5. The signal lights, if in a ward, should be shown over each bed, also at the entrance of the ward, at the nurses' station and at the grand annunciator in the superintendent of nurses' office. Together with the last mentioned, an elapsed time record can be kept, showing the time between any call and its cancellation. This is a device which always settles a dispute as to whether a call remained unanswered one minute (as the record might show) or ten (as the patient might claim).

A similar system may be installed for calling internes. The call is sent in from the main office and is flashed to different locations in the hospital. The interne, seeing his color or number illuminated, calls the office on the nearest 'phone and gets his instructions. Signal

lights for special calls, indicating special service, can also be arranged.

The loud-speaking telephone, with a sounder at convenient locations throughout the institution, is now used to good advantage for calling superintendent or doctors.

A telegraph key, with sounders at convenient points through the hospital, has been found a most effective calling device. It offers little or no disturbance to the patients.

The demand for a telephone in private rooms is so common that it is advisable to provide an outlet where a portable set can be "plugged in," giving connection with the hospital switch-board. In some sections, the local manager of the telephone company demurs at allowing this sort of connection; but an application to those higher up will usually settle the matter.

For general communication throughout the hospital, the use of the outside telephone service, with connections to all parts of the institution, gives greater flexibility than an inter-communicating system plus the outside system.

In order to be assured of accurate time throughout the institution, a system of electric clocks should be installed, the master clock being at or near the main office. The system should be from a reliable maker and accompanied by a guarantee, or connected with the master clock of the Western Union Telegraph Co.

Vacuum cleaners, it is the prevailing opinion, should be provided for every hospital of fifty beds or over, where power is available. The piping through the buildings can be very easily installed. There should be a sufficient number of outlets to make the work easy of accomplishment by the attendants, no point in any room being more than fifty feet from an outlet. Each outlet should be valved, so that the applying of the hose can be done with as little noise as possible.

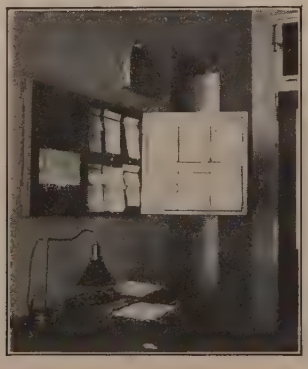


FIG. 617. WALL CHART CASE

To that end, a special construction is desirable, making it possible to enter the hose before opening the valve, thus eliminating much of the noise.

Portable vacuum cleaners are sometimes sufficient, but are more noisy than a general system.

An excellent device is a vacuum box for cleaning dry mops (Fig. 613); it avoids the very objectionable practice of shaking them out the window.

There is some question about nurses' stations. Just where that of the head nurse of the floor or section should be is a question about which there is much discussion among hospital administrators—whether in a room adjoining the ward, in the open corridor, at a semi-glazed observation station, or in the ward proper. Dr. Rowe, the late dean of hospital superintendents, used to say that he believed the nurse on duty should be in sight of her patients as well as within hearing. In large wards the center-of-the-ward station may work out with the best results.

Wherever this station may be, certain conditions and equipment should exist. The nurse should have a table or desk, with sufficient light for her work of charting and keeping her records. She should have facilities for writing her records and holding them after they are written. At this point, the nurses' call system should have its annunciator.

The writer believes that the charts, notes, and standing orders for each patient should be kept together and that, as far as possible, those sheets should be of uniform size.

The writer has found the most suitable chart-holder to be made of heavy manila paper, with the tops folded so as to enclose the top ends of all the papers, all held in place by regular ring paper clips (Fig. 614). If the charts are to be hung, each chart is punched in the right spot for hanging; if placed on shelves, the punching is not necessary. These chart-holders are light, serviceable, and noiseless. A nurse, in going through the wards with the doctor, can take in her hands the charts for the whole ward, having them ready as the patient is approached. In this way they are always kept away from the patient, whereas if the chart is left on the bed it is available to the inquiring mind of the visitor and of the patient himself.

Various methods for holding the charts in readiness for inspection are employed—one, the chart-case opening like a book with one cover against the wall, which, when open, discloses all the charts to view at one time (Fig. 617); another, the desk with "pigeonholes" for each

chart-holder; a third, adopted by the writer for use where there are a large number on one service, built on the principle of a revolving book-case, with the center of the case placed on a level with the nurse's desk, so that without rising the nurse can reach any chart (Fig. 615).

Where a room for the nurses can be provided, this should be central. The station shown (Fig. 616) illustrates an ideal nurse's station, for from this section the nurse controls not only the corridor, but the stair hall, the elevator, the patients' airing balcony and the serving kitchen entrance; with the use of the telephone, she is in touch with all departments. Fig. 617A shows another example with built-in linen cupboards.

FIG. 617A. NURSES' STATION, MATERNITY AND CHILDREN'S BUILDING, QUINCY CITY HOSPITAL

# CHAPTER XX

## EQUIPMENT

THE question of hospital equipment is fraught with nearly as many perplexities as the planning of the buildings. The question of the best bed, the best food wagon, the best operating table, or the best wheel stretcher is constantly met. There seems to be no general rule which will apply except this, that the simpler the lines of the apparatus or article which will accomplish the purpose with the greater conservation of energy of those using it, the better the equipment.

The ordinary dealer in hospital equipment tries to sell the wares which he has in stock, and is not anxious to have special designs ordered; but many times, in order to get the best results, it is necessary to have equipment specially made. It is true that the greater part of the equipment can be standardized, but it is equally true that much improvement remains to be made in some of the present standards.

Discussion of equipment may properly consider first the furniture of the patient's own room, begining with the bed. This must first of all be comfortable for the patient; it must be of the right height to make work easy for the nurse; it should have extension legs to allow of being raised at either end without blocks; it must be easy to move, yet stationary when required; it should have an adjustable back rest, a bar at the foot to take care of the extension in leg fractures, a detachable irrigator staff, and crosswise bars at the head whereby the patient may lift himself or get mild exercise. Full Gatch or Fowler position frames, built into the bed, or removable, can be used to great advantage (Fig. 618). Care should be taken that the construction of the frame is such that no projecting braces nor ties will interfere with the comfort of the patient.

To facilitate moving the bed, various forms of bed trucks are in use; that designed by Dr. Mackintosh of the Western Infirmary, Glasgow (Fig. 619), provides for a fixed foot, with large casters on the head end; when the patient is to be moved, the nurse or orderly throws a lever at the foot of the bed, forcing down a fifth leg with large caster, thus raising the foot of the bed from the floor. This leaves the bed on three large casters, ready to be moved with the slightest effort. A similar bed is now manufactured by American makers (Fig. 620). The single staff bed truck, used in a similar way, is quite effective (Fig. 621).

A fracture bed having a certain amount of resilience is now made with steel slats or carriage springs. The most popular is the open pattern, which is easily cleaned and adjusted.

The two-piece maternity bed, which allows for the removal of the foot half and adjustment of the stirrups, is generally coming into service in maternity hospitals. (See Figs. 622 and 623.)

The bedside table is perhaps the next in importance in the patient's outfit; for, in the ward, it contains prized possessions, and is subject to many uses. Its contents should not be subjected to the gaze of the occupant of the next bed; at the same time it should be open enough for good ventilation. It should be adjustable so as to serve for an "invalid" or over-the-bed table (Fig. 624); another type shown (Fig. 626) fastens directly to the bed and requires no floor space. For private rooms not connected with private baths, the utilities such as

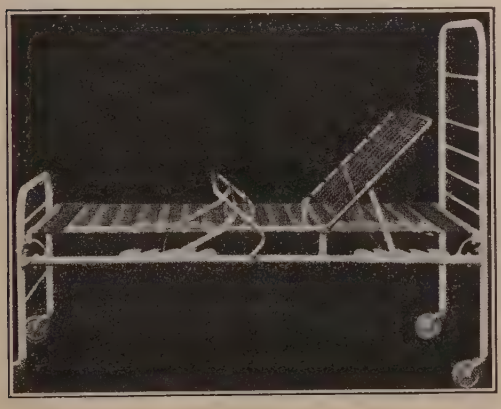


FIG. 618. BODY REST FOR FOWLER POSITION

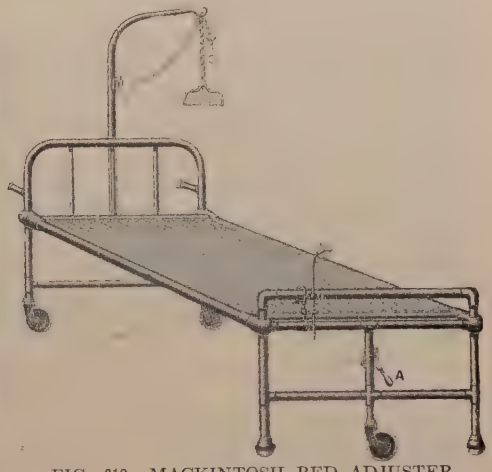


FIG. 619. MACKINTOSH BED ADJUSTER

bed-pan, bowl, pitcher, etc., may be arranged on the doors of a bedside cabinet and so kept out of sight.

In the private rooms the furniture should be refined and simple in lines, open underneath to facilitate cleaning. Plate glass tops placed over scarves of the same material as furniture covering or curtains help to bring the room into harmony. Chairs, of course, should be comfortable; if upholstered, they should have removable covers.

Footstools are always desirable. Those made similar to the Pullman car porters' stools have the advantage of stability (Fig. 627).

For mattresses, nothing has been found more comfortable than a good quality hair. Both hair and feather pillows should be provided; and the small "comfort" pillow or bolster, about five inches in di-

FIG. 620. FIXED BED TRUCK

ameter and eighteen inches long, often eases the aching back or relieves the pain of a fractured limb and is also of great service in the maternity department.

There might be added to the private room a good picture or two. Hung with a short cord directly from the back, they are easily taken down for cleaning.

A rug, preferably washable, may be added with good effect.

The hangings for the windows also should be washable.

Care of patients' clothing might well be discussed here. In some hospitals the clothing of the ward patients is carefully put into individual lockers and the keys turned over to the patient, although he himself never sees the lockers; in others, "pigeonholes" or small bins are provided for each; and in still others, the clothing of one patient is hung side by side with that of others in a clothing room.

The method adapted by the writer from the system used in the

FIG. 621. PORTABLE ONE-PIECE BED TRUCK AND IRRIGATOR STAFF

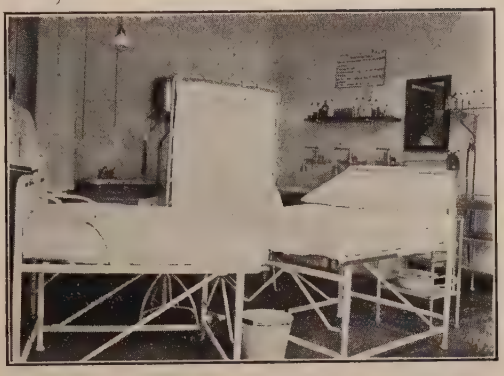


FIG. 622. TWO-PART MATERNITY BED, EUROPEAN MAKE

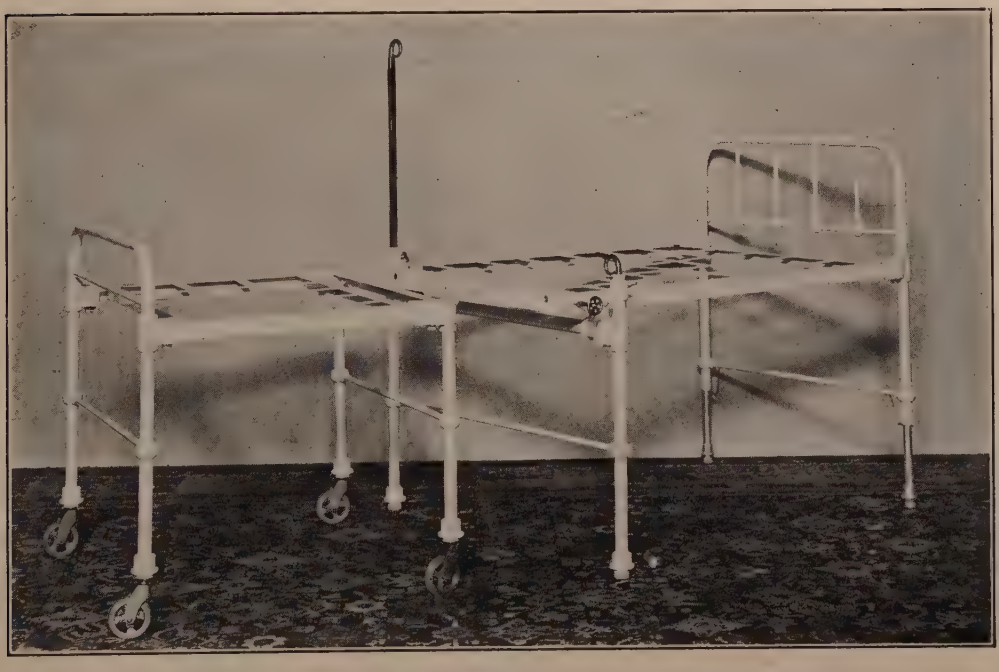


FIG. 623. TWO-PART MATERNITY BED, AMERICAN MANUFACTURE

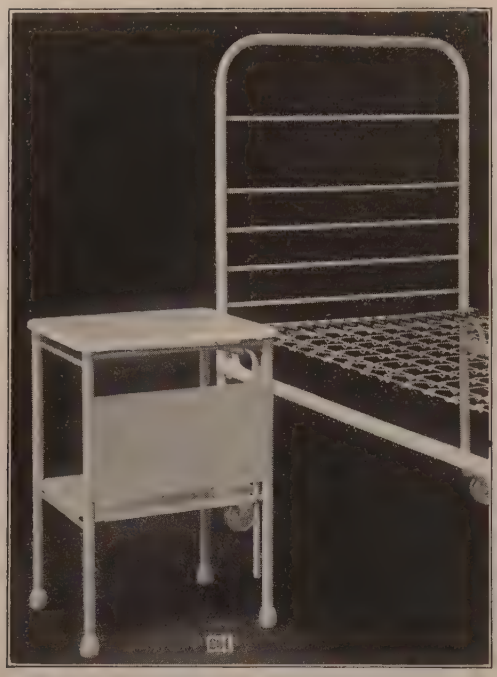


FIG. 624. ADJUSTABLE BEDSIDE TABLE

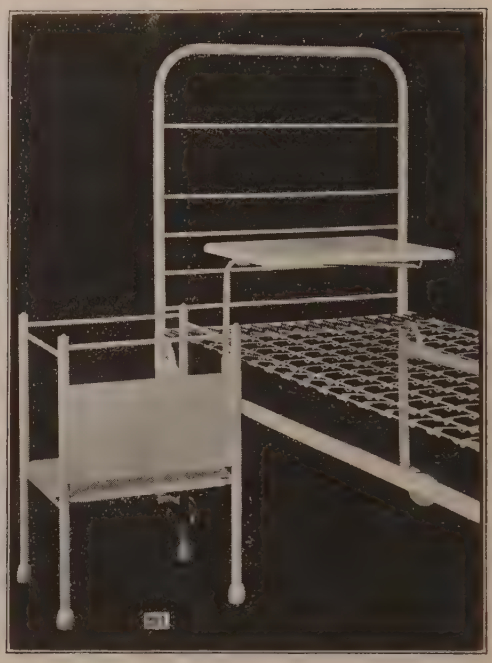


FIG. 625. ADJUSTABLE BEDSIDE TABLE, WITH TOP EXTENDED OVER BED

Munich-Schwabing Hospital (Fig. 628) is that of cloth lockers or bags of sufficient size to hold the clothing without folding. The bag is oblong, about eight by sixteen by fifty inches high, and is held in place by wire grilles at top and bottom; from the top grille a hook extends through the top of the bag and serves to hang the bag to the pipe rack erected for the purpose; from the top grille is suspended a garment hanger, with additional hooks for small garments. The bottom grille serves to hold shoes and small articles. The clothing can be placed in this bag by the patient, in the admitting room, and taken to the clothing room on a truck provided for the purpose (Fig. 629).

Great care should be taken in equipping the operating department.

Sterilizers for hospital uses have, to a certain extent, become standardized and are manufactured by numerous specialists in that line. The selection of the best is oftentimes a matter of personal judgment, but as with other hospital utilities there are certain underlying principles involved, whoever makes the apparatus.

In the dressing sterilizer one should be able to sterilize all dress-

FIG. 626. PORTABLE BEDSIDE TABLE, ATTACHED TO SIDE OF BED

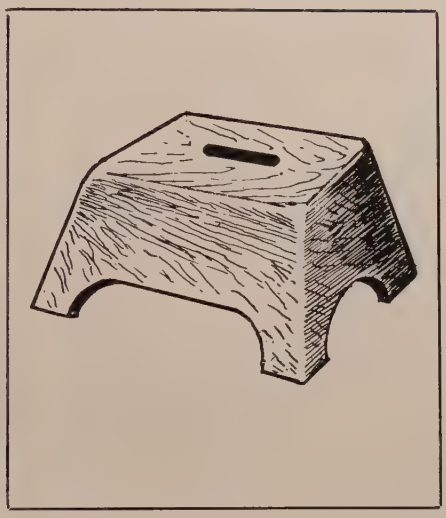


FIG. 627. PATIENT'S FOOTSTOOL

ings, sponges, and other goods needed in the operations, and have the same dry, ready for use. To do this, a steam pressure of about fifteen pounds, for a sufficient length of time, or super-heated air, or both, is necessary. The size of the apparatus depends on the needs of the institution. In America the most common forms are the horizontal, cylindrical and the globular; while in European hospitals the vertical cylindrical type or the cabinet form is used. A shape which admits of baskets or semi-closed boxes facilitates handling the dressings. The box sterilizer shown in Figs. 630 and 631, erected in the Royal Victoria Hospital, has some advantages over those of the same type found in Europe—principally in that the air is superheated and steam, at a less pressure than formerly, is introduced. The bacteriological tests, however, show absolute sterility.

The sterilizers for basins should be of sufficient size to hold what will be needed in an operation and should have an automatic lift both for cover and tray, either foot power or hydraulic.

For instruments, gloves, etc., smaller sterilizers may be used, but the same principles should prevail as in the larger.

A tank for saline solution, with thermostatic control, is a desirable addition.

The sterile water to be used in dressing, in irrigation, or for cleaning the hands during operation, must be most carefully prepared.

Bacteriologists assert that all of the harmful life is not destroyed

FIG. 628. CLOTH LOCKERS FOR PATIENTS' CLOTHING

at one boiling; but that to obtain absolute sterility, the process must be continued for three consecutive days, and even then, with careful filtration, minerals and solids are not removed. If they are right, safety to the patient will not permit the use of anything but distilled water for operation purposes. The water stills have become standardized to such an extent that stills of almost any size can be procured in the market.

If sterile water is needed in a number of different parts of the

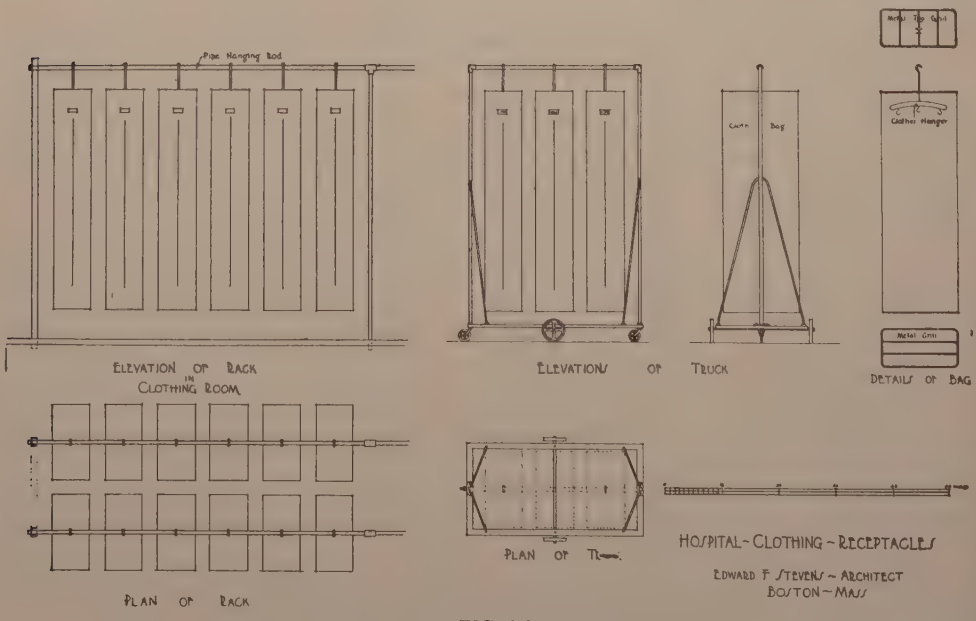



FIG. 629

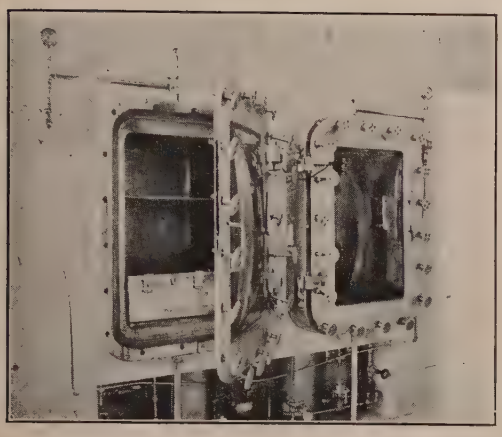


FIG. 630. BOX STERILIZERS, BUILT INTO WALL. OPEN

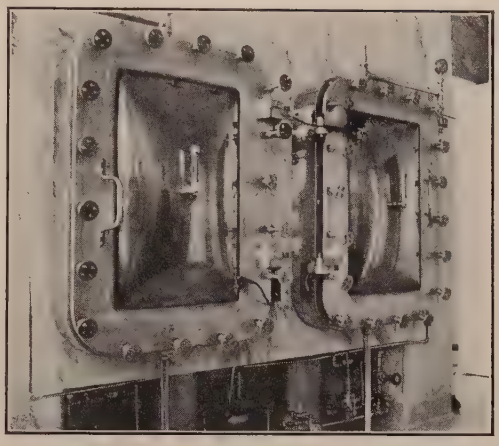


FIG. 631. BOX STERILIZERS, BUILT INTO WALL. CLOSED

institution, it is more advantageous to place the water still and receiver in an elevated position, conducting the distilled water by gravity through tin-lined pipe to the various points needed, where a local instantaneous heater can be located, with steam or electric heating unit.

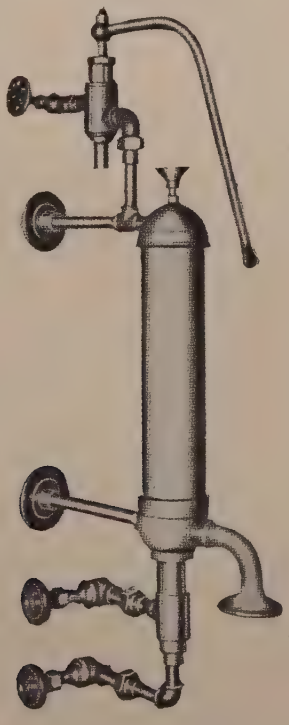
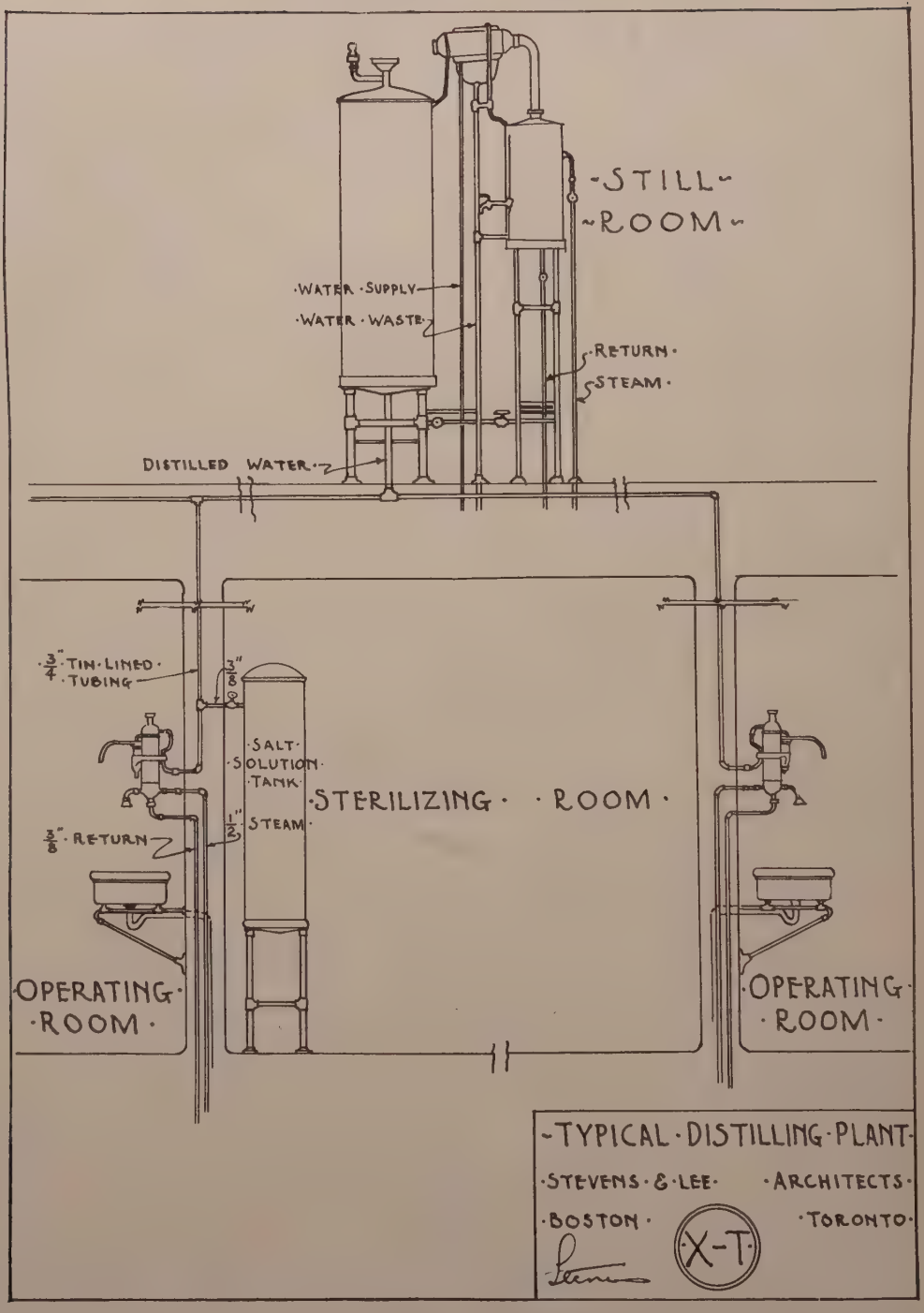


FIG. 631A. STEAM REHEATER




No. 631B. DIAGRAM SHOWING SPECIAL ARRANGEMENT FOR DISTILLED WATER

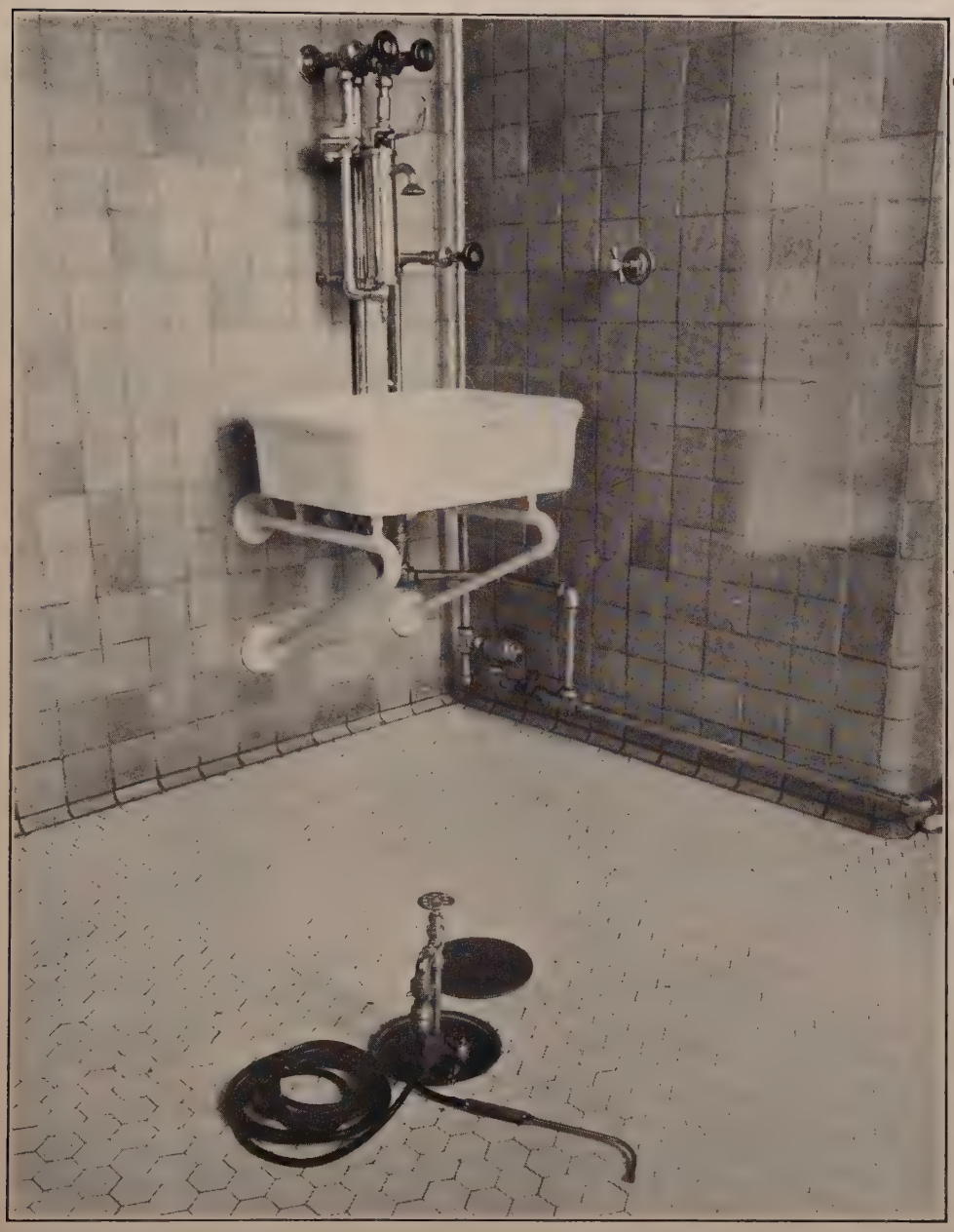


FIG. 631C. ASPIRATOR

FIG. 632. TYPICAL UTILITY ROOM RACK, HOPPER AND INCINERATOR

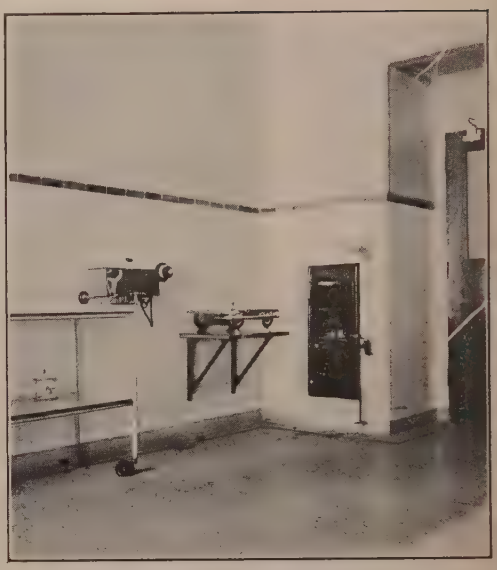


FIG. 633. SECTION OF SINK ROOM, SHOWING STERILIZER AND INCINERATOR

Fig. 631B shows a typical arrangement for a distilled water system, piped for service in various parts of the hospital; water being distilled at a higher level is conducted by gravity to reheaters (Fig. 631A) in the operating room or elsewhere. Arrangements should be made for sterilizing the pipes by live steam.

Fig. 631C shows hydraulic aspirator connected with floor connection which can be placed directly under the operating table and controlled by valve shown in the wall. This figure also shows a steam reheater for distilled water, piped from an elevation as shown in Fig. 631B.

Water from the same still, through a separate storage tank, can be used for drinking purposes for the institution, as in the Royal Victoria and the Ohio Valley General Hospitals.

It often happens in small hospitals that no high pressure steam or gas is available for heating sterilizers. Electricity or even kerosene oil can be used. The equipment for the operating rooms should be governed by the needs of the surgeons. A table with the numerous necessary adjustments, instrument and utensil tables, stools for both surgeon and anæsthetizer, and receptacles for soiled dressings are among the necessary items. If the room is fitted for compressed air, nitrous oxide gas, oxygen, and steam, the work of the surgeon is facilitated.

Cabinets for dressings, instruments, and blanket warming, either built-in (as in Fig. 171) or portable, are necessary in the operating equipment.

The newer type of alcohol dispensers, where only so much liquid as is needed is released by foot pedal action, is considered an economy, and in using this no two persons immerse their hands in the same fluid (Fig. 172).

Demand for a room where the dirty work of the ward unit can be done has developed what is commonly termed a sink-room or work room. In the older hospitals one will find no such room, and the work now being done in this room was usually done in the toilet room, with the bed-pans and urinals placed on the walls or wherever there were a few square inches of space. The need of such a room is great. Here not only are the bed-pans discharged, washed and sterilized, but there should be a place for the preservation of specimens in a cool, ventilated space, opportunity for the boiling of catheters, making of poultices, etc.

There should be a local incinerator in this room for the destruction of all ward waste, faded flowers, etc. (Fig. 632 and Fig. 633). There should be a sink for the washing of rubber sheets and utensils, and an icebox for crushed ice; in short, this should be a room which can be the general workroom for the section.

If there is no local laboratory, this room will often serve the purpose.

The disinfecting room in the general hospital should have either a steam pressure disinfector or a hot-air and formaldehyde disinfector, or both, and room for the storage of mattresses after disinfection.

# CHAPTER XXI

## LANDSCAPE ARCHITECTURE AS APPLIED TO HOSPITALS

THERE are greater possibilities for the care of the convalescent in suitably planned grounds around a hospital than within the walls; and when locating the buildings for a suburban hospital especial accessibility to the grounds should always be considered.

Wherever one goes in any of the larger institutions of Europe, one will see the convalescent patients walking or being wheeled along the shady paths, sitting under special arbors or awnings, enjoying the green grass and the flowers, and chatting with one another. Comfortable benches and easy seats, splashing fountains and simple forms of amusement, all add to the pleasure, and shorten the convalescence. Walks, with frequent benches for resting, should be provided. At the VIRCHOW HOSPITAL (Fig. 5), several acres are devoted to the park in addition to the well laid out and well equipped grounds of the hospital. In this park the staff, the nurses, the male and female patients are allowed, but on different days; so that it becomes a private park for the enjoyment of all. (See Fig. 634.)

In selecting the site, not only the exposure and the protection from cold winds should be considered, but the views from the hospital, the possible vistas from the wards or balconies. If the outlook is depressing in one direction it should be screened by a slight change in the location or by planting out the view.

The site selected may have most beautiful trees which the hospital authorities demur about having cut; but if the buildings cannot be placed to advantage without this cutting, then the test applied by some landscape architects—"If the tree were out of the way, would you wish one in that place?"—is a very good one to apply.

Runways of easy grade from the floor level to the ground are always desirable.

The planting should be carefully planned under the direction of some landscape architect of ability, so that the trees, the shrubs, the grass and the flowers bear the right relation to one another and to the architecture of the building. Shade should be provided where shade is needed, and care exercised not to plant too near the building so as to cause too much shade; shady walks are desirable, but shaded buildings never, for with the shade come dampness and chill, therefore sunlight should reach the buildings wherever possible.

The tendency of many landscape architects to mass shrubbery

FIG. 634. VIRCHOW HOSPITAL, BERLIN, GERMANY. VIEW IN GROUNDS

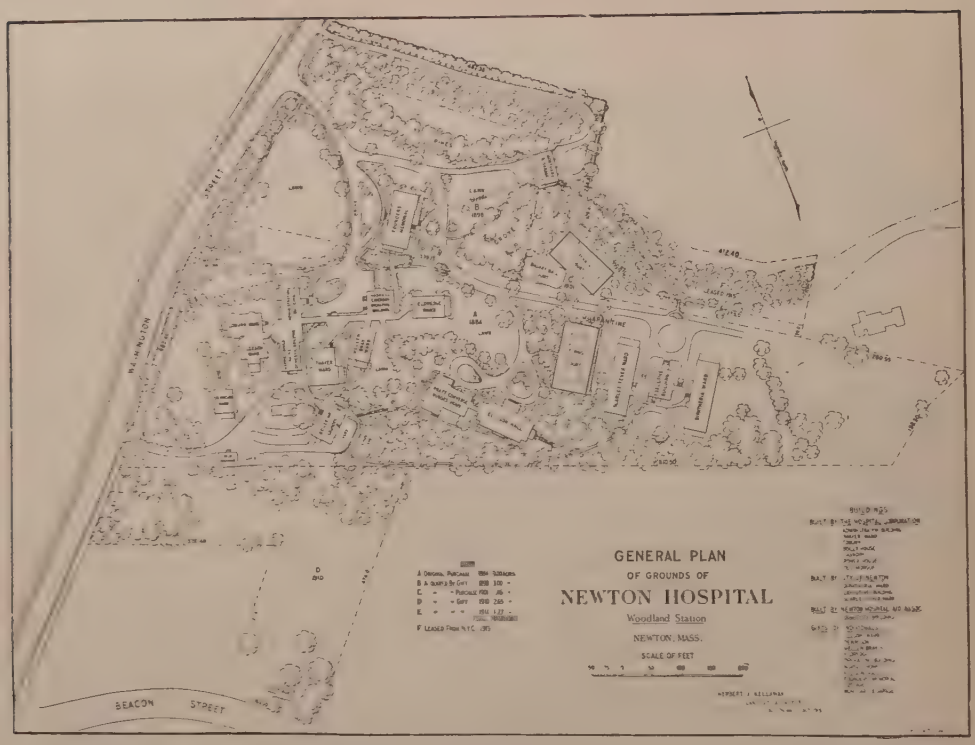



FIG. 635

FIG. 636. NEWTON HOSPITAL, NEWTON, MASS. ENTRANCE TO GROUNDS

FIG. 637. NEWTON HOSPITAL, NEWTON, MASS. FOUNDERS' MEMORIAL

FIG. 637A. NEWTON HOSPITAL, NEWTON, MASS.

FIG. 638. NEWTON HOSPITAL, NEWTON, MASS. PATHWAY TO NURSES' RESIDENCE
Herbert J. Kellaway, Landscape Architect

FIG. 639. NEWTON HOSPITAL, NEWTON, MASS. VIEW IN GROUNDS
Herbert J. Kellaway, Landscape Architect

FIG. 640. NEWTON HOSPITAL, NEWTON, MASS. WAITING LODGE

against a building, leaving the building as a background, while it may enhance the beauty of the architecture or sometimes hide it, is very apt to shade a portion of the building which needs the sunlight. It is as true in landscape planning as in building planning that the patient must be considered, and the therapeutic and healing benefits of the sun's direct rays must outweigh the architecture; for, as was said in another chapter, the hospital is built for the patient and not for the glorification of the architect or his running mate, the landscape architect.

In the laying out of the patients' lawn or patients' court, the planting should be so arranged as to act as a screen from the public, as shelters to benches, and as shields against the prevailing cold winds.

Fountains and pools, a rustic bridge and aquatic plants, if space and facility admit, and plenty of green grass add materially to the interest.

"Weeping" trees, or those suggestive of cemeteries, should not be used. Such bushes as rose, lilac, syringa, spirea, wigelia, etc., are sources of great pleasure. A succession of blooms should always be planned for.

If there are grades, these grades should be gentle, for the con-

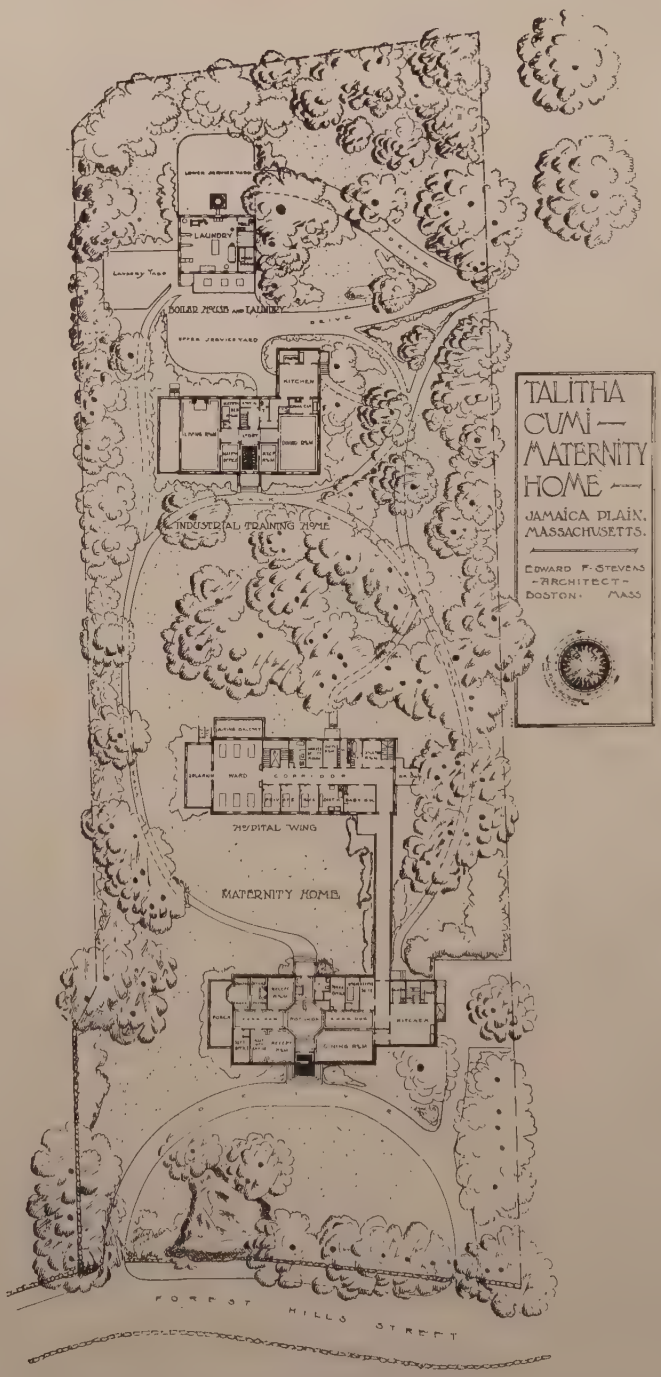

TALITHA CUMI — MATERNITY HOME
JAMAICA PLAIN, MASSACHUSETTS.
EDWARD F. STEVENS
-ARCHITECT-
BOSTON, MASS
LAUNDRY
BOILER HOUSE AND LAUNDRY
KITCHEN
INDUSTRIAL TRAINING HOME
HOSPITAL WING
MATERNITY HOME
FOREST HILLS STREET

FIG. 641

valescent must be encouraged. All these things help the patients who are just recovering from an operation or convalescing from a fever to enjoy God's great out-of-doors.

Just a few examples by way of showing how some institutions have cared for the artistic effect as well as for the comfort of the patient:

In the general plan for the NEWTON HOSPITAL (Figs. 635-640) will be seen a development extending over a score of years. When expansion was necessary more land was acquired, buildings altered and moved, and the scope of the plant increased. The whole group was brought into greater harmony by a careful study of the landscape possibilities. Roads were changed, walks created, objectionable views planted out, tennis courts built, and the whole brought into harmony.

FIG. 642

In the TALITHA CUMI MATERNITY HOME (Fig. 641) the careful study of the possibilities of the best location with the landscape architect before planning the buildings led the architect to take advantage of the natural beauty of the rather restricted site.

At the BEVERLY HOSPITAL (Fig. 642) at Beverly, Massachusetts, and the HENRY HEYWOOD MEMORIAL HOSPITAL (Fig. 643)

at Gardner, Massachusetts, the problems were similar. Steep grades were encountered and easy approaches considered, all to give not only a comfortable and dignified approach, but one which would show the buildings to the best advantage and at the same time screen the patients from the view of approaching motors. Study was made of the approach of service drives to kitchen and morgue.

The site selected for the little hospital at Ipswich, the Benjamin Stickney Cable Memorial Hospital (Fig. 644), was in the beginning a barren field; and the problem given to the landscape architect was to re-create the site by planting trees and shrubs, to make an easy approach to both front and ambulance entrances, to make an

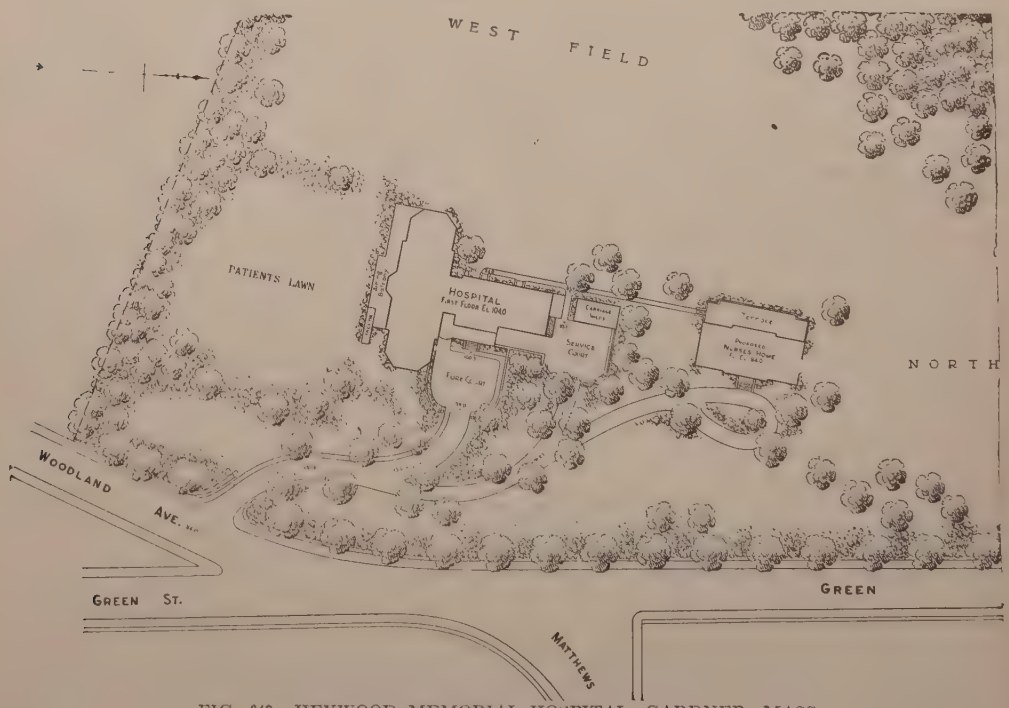



FIG. 643. HEYWOOD MEMORIAL HOSPITAL, GARDNER, MASS.
Herbert J. Kellaway, Landscape Architect

approach from the street car line to the building, and at the same time to screen all of these approaches. The high wall of the patients' court and the location of the airing balconies made this possible. The patients' court has private walks and pavilions and seats for the convalescents.

The plot plan of the Central New England Sanitarium shows

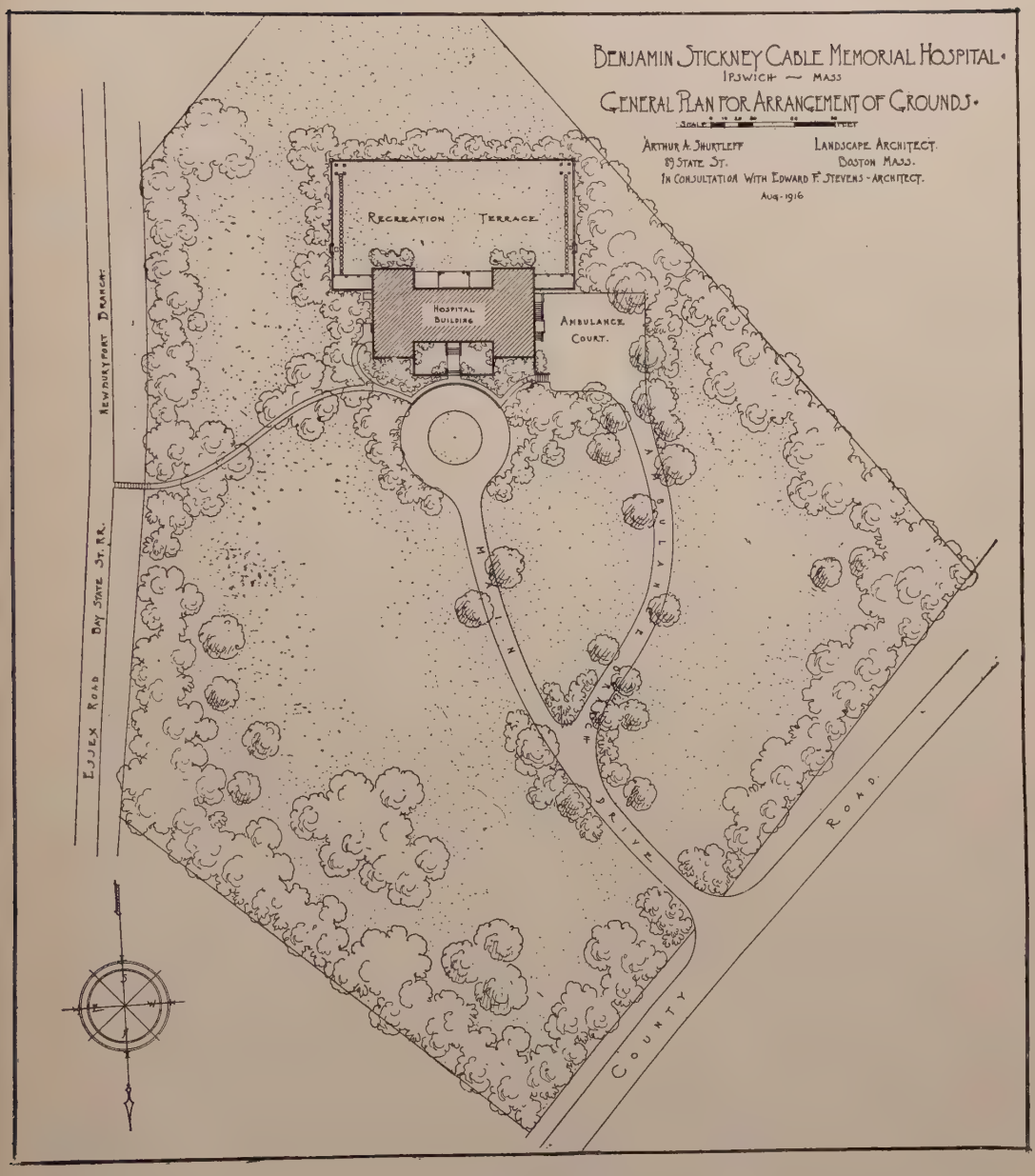



FIG. 644. CABLE MEMORIAL

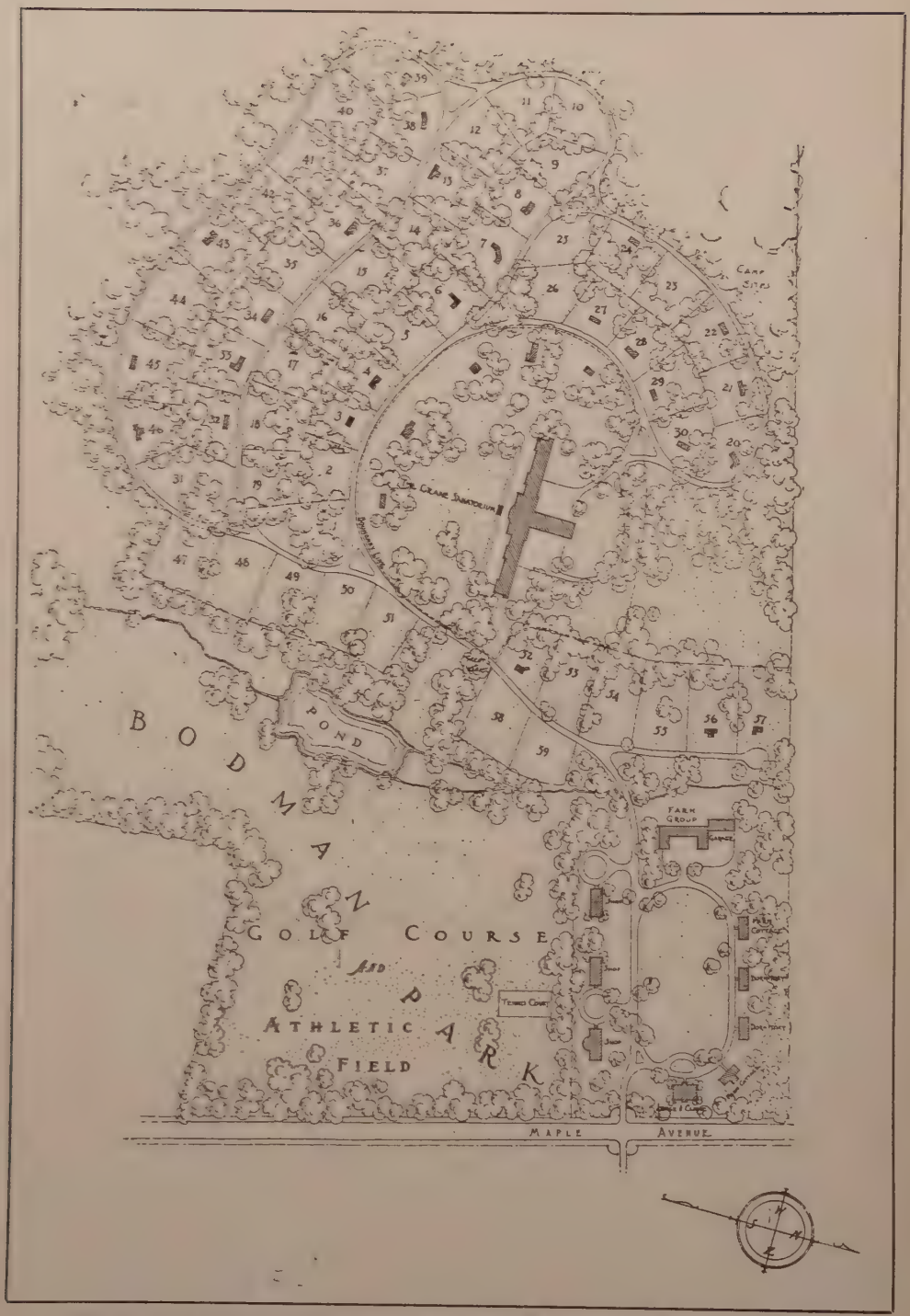
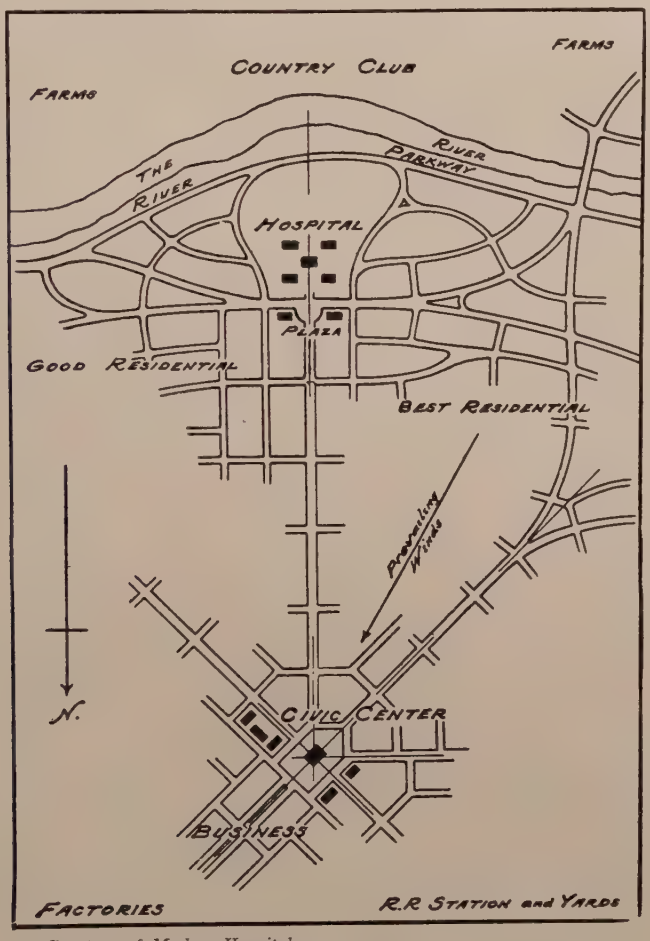



FIG. 645. PLOT PLAN -CENTRAL NEW ENGLAND SANATORIUM, RUTLAND, MASS.

a good scheme for future development. About the main buildings will be grouped a considerable number of small houses and shacks, with the industrial and physical training buildings near, a golf course and an athletic field (Fig. 645).

Fig. 646 shows a town planning scheme which includes a hospital, giving it a river view.




Courtesy of *Modern Hospital*

FIG. 646. TOWN PLAN

With the city hospital on restricted land, small opportunity may exist, but what little there is to be done should be considered wisely. One rarely sees a more charming approach to a city hospital than that to the Phipps Psychopathic Clinic at the JOHNS HOPKINS HOSPITAL.

FIG. 648. AN OLD PEOPLE'S HOME. VIEW IN GROUNDS

FIG. 649. PORTABLE SEAT, WITH AWNING

If the architects can make the approach to their hospitals speak the welcome that they try to express in the entrance to the buildings, they will go a long way toward expelling the fear of entering an institution.

# CHAPTER XXII

## REMODELING A HOUSE FOR A HOSPITAL

EVERY hospital must have its beginning; few indeed can start with a complete equipment; so the remodeled house should be looked upon as the stepping stone to something more complete.

It usually happens that before the house has been fitted for hospital purposes, enough money is expended to go far toward building a suitable, up-to-date institution. Even then there will be waste and unavailable room, which must be heated and taken care of. The finish which is attractive and necessary for a residence becomes almost a menace in a hospital. The staircases and halls are generally narrow, the rooms are not properly ventilated, the toilets are badly arranged, and the floor materials are not suitable. In other words, an undue amount of energy must be expended in the housekeeping for such a building, and this will detract, in all probability, from the care of the patient.

In many of the smaller cities and large towns the hospital center has been started by a gift by some philanthropic citizen of his palatial residence as a hospital. Much good work has been done and is being done in these old residences and all honor to these public spirited citizens who have started these splendid enterprises. The time, however, soon comes when the residence no longer functions because of overcrowded conditions or the fire menace in these non-fireproof buildings, and the architect is brought in to enlarge and modernize the residence.

Often the hospital committee may be persuaded to use the residence as a nurses' home and have a new hospital designed, while in other cases the building is modernized by new additions.

Some of the first difficulties in making such a building into a hospital are narrow doors through which no bed will pass, stairs so steep and winding that they make difficult the carrying of a patient from one story to another, high windows, small bathrooms, the finding of proper locations for service rooms, proper lighting for operating room, etc., as well as the general unhygienic conditions of old finish and floors.

In adding new buildings to old, a change of level from one portion of the building to another is often necessary; this should always be done by ramps and not by stairs, and the ramps should not be more that an eight per cent rise.

The larger and more symmetrical the house, the better the hospital it will make. Not every house will develop into a good hospital, however, for there are many essentials required by the hospital which are not required in the house. The house, if it is to be used as a general surgical and medical hospital, must have a room which can be adapted into a well-lighted operating room with its adjacent utilities; also rooms of sufficient size to accommodate a reasonable number of beds; and rooms for the cooking and serving of meals. When a house of this character can be found, then it is practicable to utilize it for a hospital, with proper care of details.

The selection of the house to be used must have the same care as the selection of a site for a new hospital; that is, there must be sufficient light and air about the building to insure good ventilation;

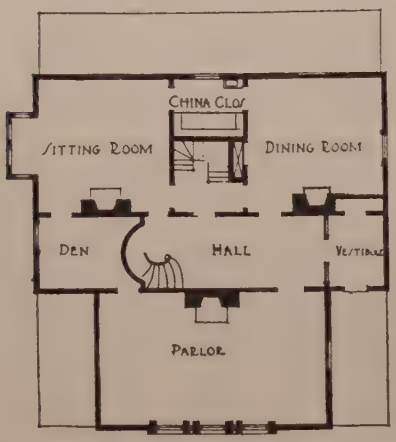



FIG. 650. FIRST FLOOR, BEFORE MODIFICATION

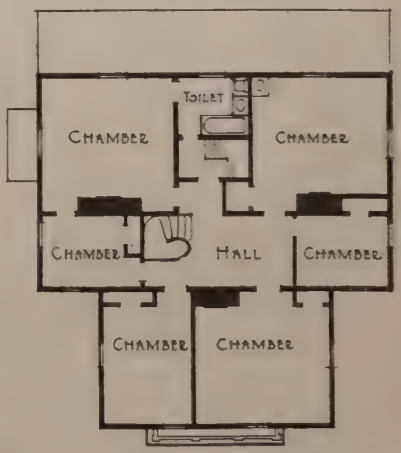



FIG. 651. SECOND FLOOR OF CHOATE HOMESTEAD

there must be freedom from disturbance from adjoining property, and, if possible, a pleasing view from the building. Care should be taken to select a house where the sunshine penetrates the principal rooms.

The CHOATE MEMORIAL HOSPITAL, Woburn, Massachusetts, shows two different developments made several years ago.

In the first development it will be seen how, with very modest changes, a fairly workable hospital was evolved. The exterior was of the type one often encounters in New England especially, built in the sixties, with great double parlors, heavy cornices and finish, stately dining room and serving pantry, and basement kitchen. All of this, however, lent itself to "hospital treatment," as will be seen by com-

paring the plans of the original house with those of the replanned hospital. The funds available for alterations were small and the changes necessarily restricted.

The grand parlor made an excellent five-bed ward without change, while the sitting room served as a children's ward, and the little den as the hospital office. The circular stairs had to go, and were replaced by more commodious stairs, up which a stretcher could be carried. The dining room was cut into a corridor, a serving kitchen and a linen closet. The garden porch served as an airing balcony.

The second story also developed simply and inexpensively. A good operating room and accessories were made from one of the large

FIG. 652. THE CHARLES CHOATE MEMORIAL HOSPITAL AS PRODUCED BY THE FIRST MODIFICATION OF THE CHOATE HOMESTEAD

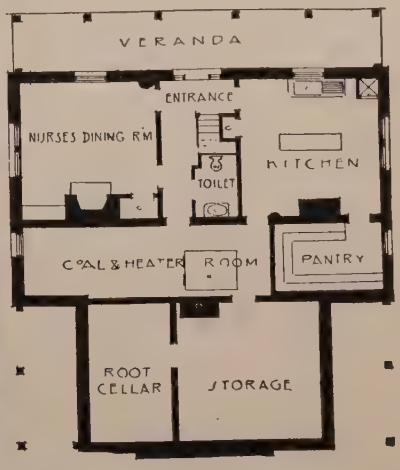



FIG. 653. BASEMENT AS FIRST REMODELED

chambers, while another served as a second-story serving room. The balcony was extended to this story.

The changes in the basement were small. The kitchen needed no change; the old laundry served nicely for a nurses' dining room; in the attic, the servants' rooms were used for nurses. Thus the Charles Choate Memorial Hospital started out as a complete fourteen-bed institution.

During the eight years of successful management after the opening, friends of the hospital, seeing the splendid work being accomplished with a simple equipment, came to the rescue with bequests and generous donations, so that in 1916 the much-needed expansion was authorized.

To plan for the growing needs of the present and the future and to preserve and bring into harmony as much of the old building as possible with the new was the problem now to be worked out. The greatest needs were, first, better operating facilities; second, more private rooms; and third, a maternity department worthy of the name.

But few changes were necessary in the original building, as will be noted on plans (Figs. 652-656). The kitchen was enlarged: the old nurses' dining room was made into cold storage and a serving room for the new dining room; the stairs were removed and the serving kitchens enlarged; the old operating suite was turned into a

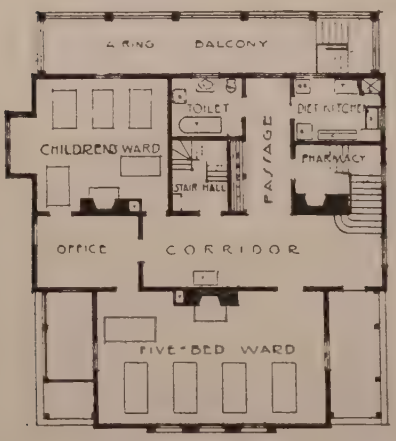



FIG. 654. FIRST FLOOR AFTER FIRST REMODELING

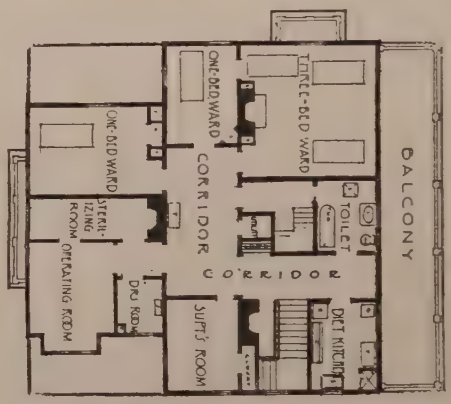



FIG. 655. SECOND FLOOR AFTER FIRST REMODELING

One large bedroom has been transformed into an operating room, and another into a diet kitchen. The other bedrooms have become wards and superintendent's room, respectively.

Edward F. Stevens, Architect

maternity delivery room and bath room, and one of the private rooms taken as a creche.

The new portions were planned to meet the deficiency of the old building and the growing needs of the community. A new main entrance and office were created, and a new operating department was provided.

The operating department consists of two north-lighted operating rooms, a sterilizing room, an anæsthetizing room, a nurses' work room, and a surgeons' locker and dressing room. All these rooms are grouped around an octagonal rotunda, in the center of which is a triple scrub-up fountain, designed not only as a necessary utility, but also as an architectural feature of the department (Fig 587). The base of the fountain is of mosaic; the bowl is porcelain enameled, 40 inches in diameter; the water is controlled by the latest type of el-

bow valves; and the whole is surmounted by a utility shelf of opal glass. The large size of the rotunda leaves ample room on all sides for the wheel stretcher to pass. The floor of this department is of terrazzo and the walls are enameled hard plaster. Large north windows, extending above the ceiling, give the best of daylight, while four special artificial lights illuminate the operating rooms at night.

The ambulance entrance is below the surgical department and adjoins the laboratory, the X-ray, and the autopsy rooms. A small

FIG. 656. THE CHOATE HOSPITAL AS IT APPEARS AFTER ADDITIONS AND FINAL REMODELING
Edward F. Stevens, Architect

isolating suite, with special plumbing, is provided, as well as drug and storage rooms.

In the basement of the medical wing are located the nurses' dining room, the lecture and ladies' aid rooms. An automatic electric elevator connects all stories. The first story of the medical and the second story of both the surgical and medical wings are planned for private patients, mostly single rooms being planned. At the south end of the building airing balconies are provided.

Sink rooms, toilets, baths, and linen rooms are arranged for the efficient carrying out of modern hospital service. The floors of all wards, rooms, and corridors are covered with linoleum; the doors are without panels; and all detail of finish is of plain, simple construction.

For the mechanical plant, the old stable was utilized, affording plenty of room for the heating and laundry equipment.

These remodeled buildings, with the nurses' residence (also a donation) on the same site, make a complete thirty-three-bed hospital.

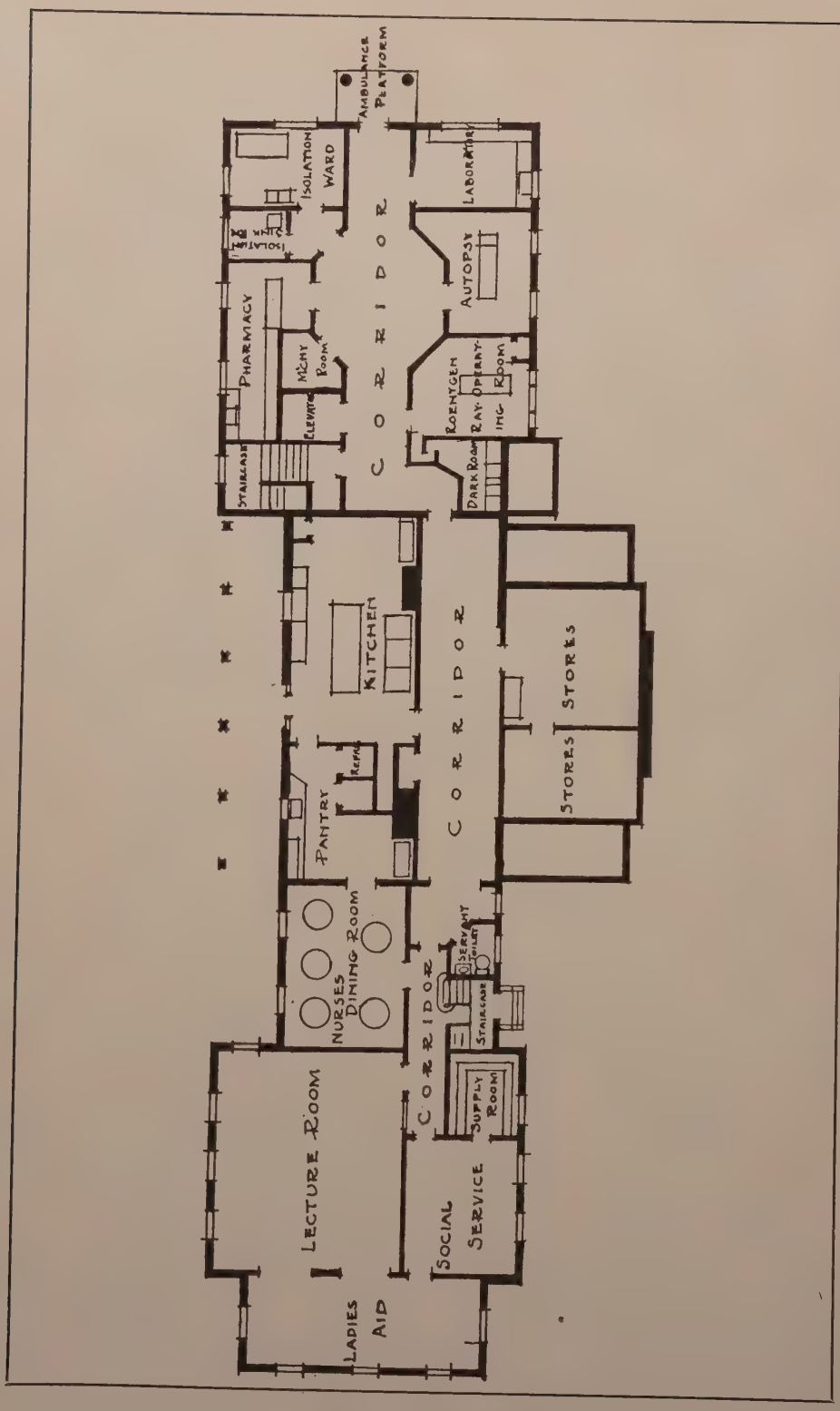



FIG. 657. GROUND FLOOR OF CHOATE MEMORIAL HOSPITAL IN ITS PRESENT FORM

FIG. 658. FIRST FLOOR, CHOATE MEMORIAL IN ITS PRESENT FORM

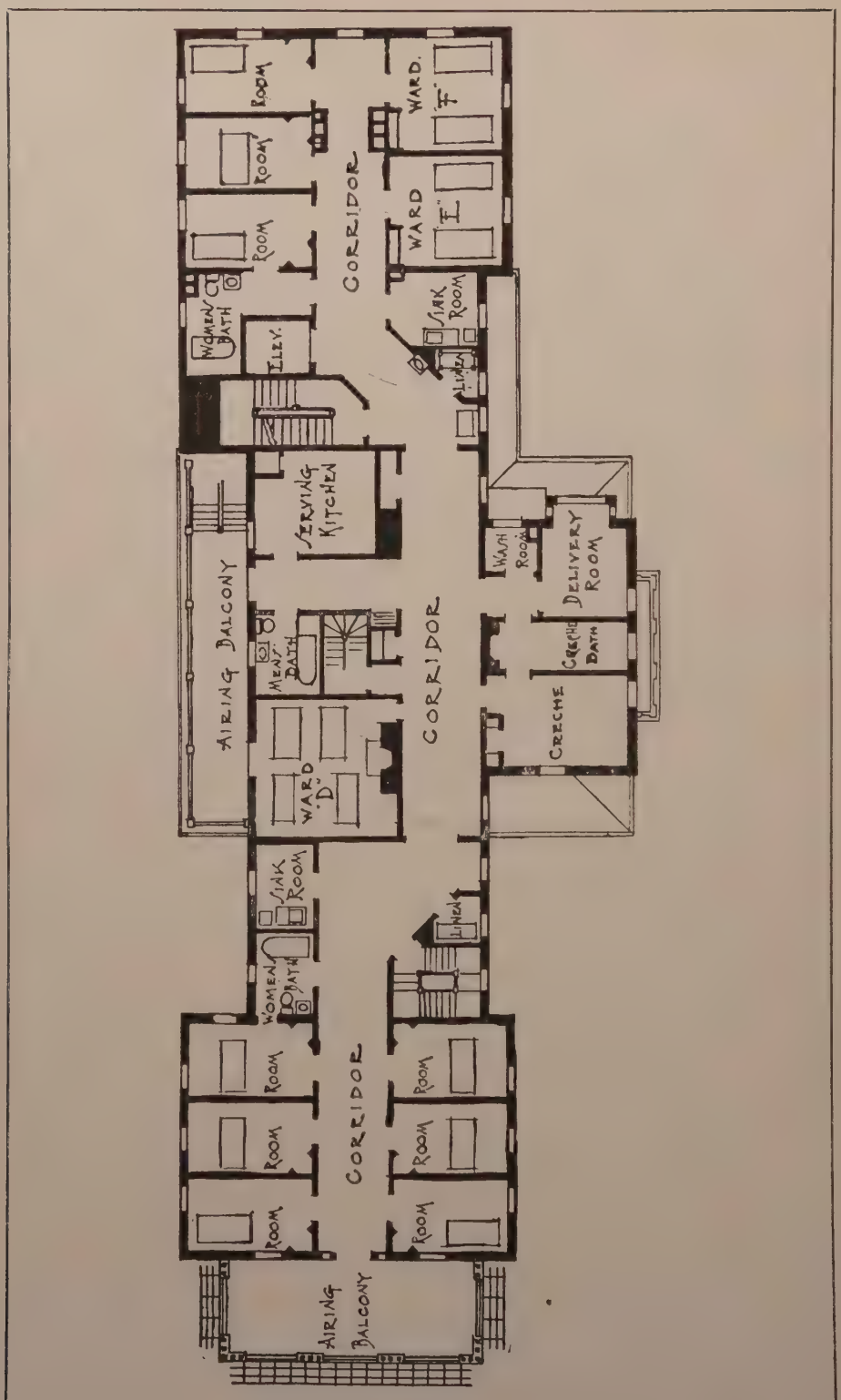



FIG. 659. SECOND FLOOR, CHOATE MEMORIAL HOSPITAL IN ITS PRESENT FORM

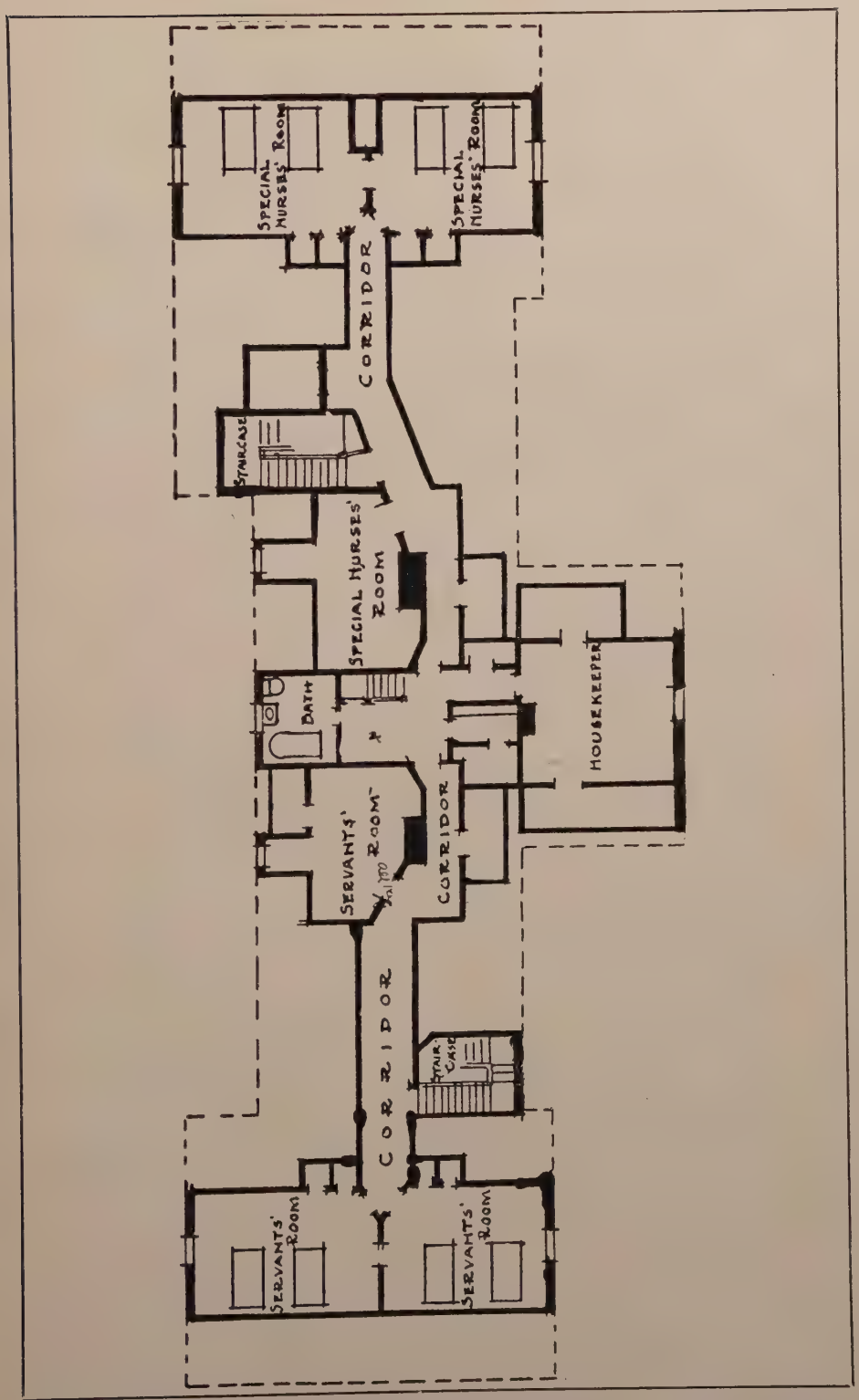



FIG. 660. ATTIC FLOOR, CHOATE MEMORIAL HOSPITAL IN ITS PRESENT FORM

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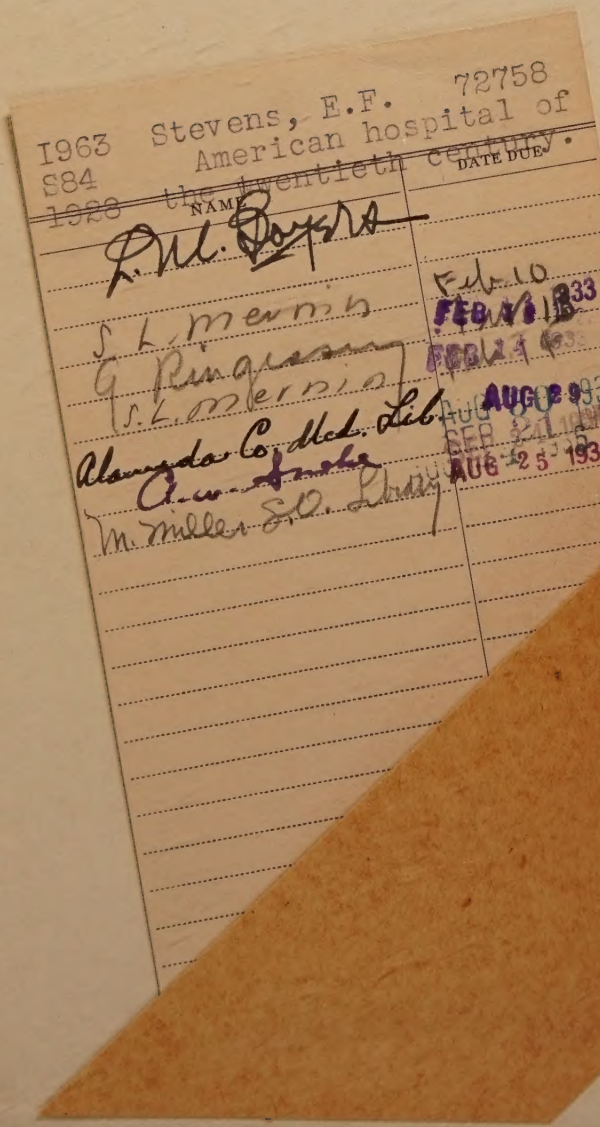
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